THE RISE AND FALL OF THE OPIOID CRISIS:
A Comparative State by State Study

Alexandra K. Bouthillette

TC 660H
Plan II Honors Program
The University of Texas at Austin

May 7, 2019

Mark Smith, Ph.D.
Department of American Studies
Supervising Professor

Diana DiNitto, Ph.D.
School of Social Work
Second Reader

Special Thanks To: Bethany Breck

Abstract

Author: Alexandra K. Bouthillette

Title: The Rise and Fall of The Opioid Crisis: A Comparative State by State Study

Supervising Professor: Mark Smith, Ph.D.

The rise of addictive prescription opioids has ravaged the United States, leading to overdose deaths and health concerns, thereby spurring government policy initiatives to alleviate the 'opioid crisis.' This crisis has expanded beyond prescription drugs to also include a rise in illicit heroin and fentanyl use. According to the National Institute on Drug Abuse, 130 people die in the United States every day from an opioid overdose. However, this statistic is not uniformly distributed across each state. Some states, such as West Virginia, Ohio, New Hampshire, Pennsylvania, and Kentucky, face much higher rates of opioid overdose. As such, this thesis will attempt to answer two questions. First, what existing conditions make a state's population susceptible to high rates of opioid dependency and overdose. Second, which opioid related public policies are most effective at decreasing rates of opioid dependency and overdose. In the past, government policies have focused on punitive measures, such as incarceration, but these types of policies fail to address recovery for already dependent users. Only recently has the government launched initiatives to target treatment and recovery services and opioid addiction education. However, despite policy efforts aimed at reducing opioid misuse, addiction and overdose rates have continued to rise.

Table of Contents

Chapter I: Introduction and Background

Part I: Introduction

According to the National Institute on Drug Abuse, 130 people die in the United States (US) every day from an opioid overdose (2019). In 2015, the economic cost of the opioid crisis was valued at $504 billion, and over 2 million "prime-age[1] individuals were not in the labor force due to opioids" (Early; Gitis). The rise of addictive prescription opioids has ravaged the US leading to a public health crisis. Until approximately 2013, the majority of overdoses were due to prescription opioid misuse; however, since this time, an increasing number of opioid overdose deaths are attributed to heroin and synthetic opioids like fentanyl. For example, in 2015, there was a 75 percent increase in overdose deaths due to illicit synthetic opioids (Haddy 3). Similarly, heroin overdose deaths have increased four-fold since 2010 (U.S. Department of Health and Human Services). The rise of the opioid crisis can be partially attributed to a change in the way physicians began treating acute pain, coupled with a lack of education about proper opioid prescribing and usage, and an array of other factors, including, but not limited to, aggressive pharmaceutical marketing, economic strife, and a lack of alternative pain treatment options. Moreover, physicians were able to liberally prescribe opioid painkillers, which quickly flooded the country, but prescribers and facilities were heavily regulated when it came to treating opioid use disorder (Macy 219). Thus, to end this crisis by properly treating those with opioid use disorder and preventing new cases of this disorder, we must understand the causes of opioid use disorder and establish effective policy responses.

Although the opioid crisis has devastated the United States, the impact is not uniformly distributed across the states. Some states, such as West Virginia, Ohio, New Hampshire,

[1] Prime-age represents worker 25 to 54 years old (Gitis).

Pennsylvania, and Kentucky, face much higher rates of opioid overdose deaths. Accordingly, this thesis endeavors to answer two questions. First, what existing conditions make a state's population susceptible to higher rates of opioid dependency and overdose. Second, which public policies are most effective at decreasing rates of opioid dependency and overdose. To answer these questions, the thesis is divided into four chapters. The remainder of this first chapter defines what opioids are, how they work in the body, and presents a deeper examination of the current state of the crisis. The second chapter discusses the factors associated with the rise of opioid use and analyzes how these factors apply to the states with the five highest and five lowest rates of opioid overdose. The third chapter examines the most common state policy responses to combat the opioid crisis. These policies will be compared to the policies in the five states with the highest rates of opioid overdose to determine the effectiveness of these states' responses. Finally, the fourth chapter discusses a multivariable regression analysis that examines relationships between rates of opioid overdose deaths and characteristics across the 50 states, including policies they have adopted regarding controlled substances. The following chapters are based on primary sources, (e.g. government reports and bills), research studies (e.g. analyses by experts in the field), and raw data.

Part II: Background

The rise in opioid use began in the mid-1990s after the induction of pain as the fifth vital sign and Purdue Pharma's development of OxyContin[2] in 1996, arguably the most popular opioid medication in history (See Chapter II) (National Academies of Sciences, Engineering). In previous decades, pain as a symptom was underacknowledged by physicians because unlike other vital signs, pain is often "invisible" (Baker 2). As such, physicians were "'rarely held accountable'" for inadequate pain control (Baker 2). Between 1997 and 2001, formal pain standards were established

[2] OxyContin is a name brand for Oxycodone.

to better measure and quantify pain in the health care setting, otherwise referred to as pain as the fifth vital sign (Baker 2).

Prescription opioids were developed to treat moderate to severe pain for health conditions like cancer, arthritis, physical injury, etc. The term opioid includes prescription drugs such as hydrocodone, oxycodone, morphine, and fentanyl[3], as well as illicit drugs like heroin (U.S. Department of Health and Human Services). Opioids are natural or synthetic chemicals that interact with opioid receptors on nerve cells to reduce the intensity and feeling of pain (U.S. Department of Health and Human Services). As of 2015, the most commonly used categories of prescription opioids were hydrocodone and oxycodone products (Hughes). Approximately 21.8 percent of the population aged 12 or older used hydrocodone in 2015, and 10.4 percent used oxycodone (Hughes). Oxycodone is classified as a Schedule II drug, which means it has a high potential for abuse that may lead to severe psychological or physical dependence ("Drug Classifications, Schedule I, II, III, IV, V"). In 1995, FDA examiner Curtis Wright approved OxyContin after reviewing documents detailing the drug's potential abuse and addictive nature, but urged caution and care for promotion of the drug (Macy 63). However, Purdue did not promote the drug as addictive, instead utilizing falsified and misleading reports (Macy 63, 85). It was not until 2000 that Purdue publicly acknowledged OxyContin's addictive nature (Macy 63). Hydrocodone is also classified as Schedule II, after being moved up from Schedule III[4] in 2014 because it was found to be more addictive than originally anticipated (Macy 197). Morphine, opium, methadone, and codeine are also Schedule II drugs, while heroin and fentanyl are Schedule

[3] Although a prescription drug, fentanyl is a synthetic opioid that is often produced illegally and obtained outside of a prescription setting.
[4] Schedule III drugs are substances or chemicals defined as drugs with a moderate to low potential for physical and psychological dependence ("Drug Scheduling").

I, meaning they are "drugs with no currently accepted medical use and a high potential for abuse" (U.S. Department of Justice; "Drug Scheduling").

Opioid pain medications are generally safe when taken for a short time and as prescribed, but are at risk for misuse because they produce euphoria (U.S. Department of Health and Human Services 5). Despite the continuous increase in opioid prescribing since the 1990s, there is "an astonishing lack of evidence" that opioid therapy actually works for treating of chronic pain (Hilliard 177). Further, numerous studies have found that "opioids for chronic pain may actually worsen pain and functioning, possibly by potentiating pain perception" (Frieden 1501-1502). Overall, opioids have "uncertain benefits, especially as compared with other treatments for chronic pain," and proven risks of addiction and overdose (Frieden 1502). As such, the CDC recommends nonopioid therapy for chronic pain, except for instances of cancer, palliative, or end-of-life care" (Frieden 1503). Nonopioid treatments to reduce chronic pain include a variety of therapies, such as exercise, psychological, weight loss, and chiropractic treatment, as well as combinations of anti-inflammatory or antidepressant drugs (Frieden 1503). Studies find that opioids are no more effective than these types of drugs, while these drugs are more tolerable for long-term use (Frieden 1503).

Opioid misuse can be defined as "use in any way not directed by a doctor, including use without a prescription of one's own; use in greater amounts, more often, or longer than told to take a drug; or use in any other way not directed by a doctor" (Hughes). Opioid use disorder (OUD) can be defined as the "loss of control of opioid use, risky opioid use, impaired social functioning, tolerance, and withdrawal" (U.S. Department of Health and Human Services 5). According to the Substance Abuse and Mental Health Services Administration (SAMHSA), the most common

misuses of opioids were to relieve pain,[5] followed by to feel good or get high, to relax or relieve tension, to help with sleep, to help with feelings or emotion, and to experiment with the drug (Hughes). SAMHSA finds that of those who misuse opioids, 53 percent obtained them from a friend or relative, 37.5 percent from one or more prescriptions or by stealing from a health care provider, and only 35.4 percent through a prescription from one provider (Ahrnsbrak 24).

> *"'It was like shooting Jesus up in your arm…It's like a white explosion of light in your head. You're floating on a cloud. You don't yet know that the first time is the best. After that, you're just chasing that first high.'" – Opioid User in Dopesick (Macy* 136*)*

The three characteristics that influence an opioid's addiction potential include the drug's specific chemical compound and formulation, the intended route of administration, and the dosage prescribed (National Academies of Sciences, Engineering). Regarding chemical compounds, a 2008 study found that oxycodone's compound was found most "likeable" among participants, leading to higher potential for misuse (National Academies of Sciences, Engineering). Further, methadone, for example, only accounted for 1 percent of all opioid prescriptions from 2007 to 2014, yet it accounted for 22.9 percent of all overdoses, indicating that the methadone compound has a higher risk of overdose potential than other opioid compounds (National Academies of Sciences, Engineering). In terms of formulation, the FDA finds that immediate release formulas are associated with increased risk of misuse (National Academies of Sciences, Engineering). Regarding administration, drugs that are injected or snorted enter the bloodstream more quickly, therefore accelerating the "crossing of the blood-brain barrier, generating a faster onset of action," which is linked with a greater risk of overdose and development of OUD (National Academies of

[5] Using opioids to relieve pain "without a prescription of one's own or use at a higher dosage or more often than prescribed" is considered misuse (Hughes).

Sciences, Engineering). Pills, which are the most common form of prescription opioids, are easily crushed in order to be snorted, smoked, or injected (National Academies of Sciences, Engineering).

As explained by the U.S. Department of Health and Human Services, opioids can "hijack the brain's reward system by inducing feelings that motivate people to use those substances" repeatedly "despite the risk for significant harm." The addiction process involves three stages: "(1) Binge/Intoxication, the stage at which an individual consumes an intoxicating substance and experiences its rewarding or pleasurable effects; (2) Withdrawal/Negative Affect, the stage at which an individual experiences a negative physical and emotional state in the absence of the substance (withdrawal); and (3) Preoccupation/Anticipation, the stage at which one seeks substances again after a period of abstinence" (U.S. Department of Health and Human Services 12). Effects from opioids include euphoria, drowsiness, slowed breathing, and reduced pain signaling (U.S. Department of Health and Human Services 13). Symptoms of withdrawal include "profound negative emotions and physical symptoms, such as bodily discomfort, pain, sweating, and intestinal distress" (U.S. Department of Health and Human Services 13). Finally, repeated exposure to these chemicals can lead to progressive changes in the structure and function of the brain (U.S. Department of Health and Human Services 12).

> *"'You're throwing up. You have diarrhea. You ache so bad and you're so irritable that you can't stand to be touched. Your legs shake so bad you can't sleep. You're as ill as one hornet could ever be…And believe me, you'll do anything to make that pain go away.'" – Opioid User in Dopesick (Macy 41)*

In addition to painful withdrawal symptoms, OUD has other consequences that not only harm one's self, but also others. For example, in the US, neonatal abstinence syndrome (NAS)

increased 383 percent from 2000 to 2012 (*The Mayor's Task Force to Combat The Opioid Epidemic in Philadelphia* 10). NAS is infant opioid withdrawal syndrome caused by a mother who misused opioids during her pregnancy (U.S. Department of Health and Human Services 7). NAS results in low birthweights, respiratory complications, neurological excitability, gastrointestinal dysfunction, and potential long-term effects that interfere with the child's brain development (*The Mayor's Task Force to Combat The Opioid Epidemic in Philadelphia,* U.S. Department of Health and Human Services 10).

Another consequence of OUD is the rise in heroin and fentanyl use. As prescription opioids become less available due to policy restrictions on opioid prescriptions and abuse deterrent formulations[6] (See Chapter III Part I), those with OUD turn to illicit opioids to achieve the same 'high.' For example, 80 percent of the increase in heroin deaths can be attributed to OxyContin's reformulation[7], and those dependent on non-heroin opioids are 40 times more likely to become addicted to heroin (National Academies of Sciences, Engineering; Dhanda 561). Similarly, US deaths attributed to fentanyl increased 540 percent between 2013 and 2016 (Dasgupta 183). Fentanyl is stronger than heroin, and is 80 times more potent than prescription counterparts, like morphine (Compton). As of 2017, 75 percent of opioid overdoses involved fentanyl (*New Hampshire Governor's Commission on Alcohol and Drug Abuse*). This rise in injection drug use has also led to a rise in infectious diseases such as HIV, hepatitis, and other blood-borne diseases due to the sharing of dirty needles (U.S. Department of Health and Human Services 8). Drug-related crimes have also increased in conjunction with the rise in heroin and fentanyl use (National Academies of Sciences, Engineering).

[6] In August 2010, the FDA intervened and required opioids to be reformulated to be abuse deterrent because so many users were crushing pills to snort or inject in order to achieve an opioid 'high" (Macy 133).
[7] OxyContin's reformulation makes it more difficult to crush and snort.

Furthermore, the economic impact of opioid use has been dramatic. It is estimated between 1999 and 2015, the decline in labor force participation due to opioid use resulted in a cumulative 27 billion work hours lost (Gitis). As a consequence, the real annual economic growth rate declined by .6 percent, which is equivalent to $1.6 trillion in real output (Gitis). As mentioned before, these effects are not equally distributed across states. States like West Virginia and Kentucky are much more negatively impacted (Gitis). For example, the reduction in the prime-age labor force participation was largest in West Virginia at 3.8 percent, reducing West Virginia's economic growth by 1.7 percent, while Kentucky's prime-age labor force participation declined by 2.8 percent (Gitis).

At an individual level, other consequences of OUD are include facing drug-use related stigma, deteriorating relationships, poor school performance, loss of employment, diminished mental and [physical] health, increased health care costs, reduced quality of life, and increased violence, child abuse, and neglect (*The Mayor's Task Force to Combat The Opioid Epidemic in Philadelphia* 10). Kathryn Hahn of Oregon State University College of Pharmacy finds that healthcare costs are eight times higher for those who misuse opioids versus those who do not. Finally, those who have lost someone to OUD also face significant grief (National Academies of Sciences, Engineering).

Part III: Chapter Conclusion

Since the mid-1990s the opioid crisis has ballooned into a national health emergency. Areas of the country like the Northeast and Appalachia have been particularly affected. Opioid use dependency has escalated at alarming rates, taking over 100 American lives a day. As a result, opioids have contributed to the first decline in US life expectancy since the AIDS epidemic (Gitis). Those with OUD struggle with withdrawal symptoms and often have limited access to treatment.

Action must be taken to alleviate this crisis and help those with OUD. To prevent a similar situation in the future, we must understand the underlying causes of this crisis. As such, the next chapter discusses factors associated with the rise in opioid use.

Chapter II: Factors Associated with the Rise in Opioid Use

To combat the opioid crisis and avert a similar crisis in the future, it is important to understand factors associated with the rise of opioid misuse and opioid overdose. The first half of this chapter focuses on overarching factors behind the crisis – factors that affected the nation as a whole – such as changes in medical practices surrounding pain treatment; the influence of large pharmaceutical companies, referred to as "big pharma;" over prescription; and a lack of opioid prescribing education for physicians. However, as explained in Chapter I, the extent of the opioid crisis varies state by state. For example, areas in the Northeast and Appalachia region have much higher rates of opioid overdose compared to areas in the West and South. Thus, the second half of this chapter focuses on reasons underlying the disparity in opioid usage by state. This chapter discusses the five states with the highest rates of opioid overdose as of 2016 (West Virginia, Ohio, New Hampshire, Pennsylvania, and Kentucky) and compares them with the five states with the lowest rates of opioid overdose as of 2016 (Nebraska, South Daskota, Texas, North Dakota, and Iowa). This comparative analysis is intended to suggest factors that may make populations vulnerable to opioid misuse and overdose. As discussed below, prescription rates, demographics, insurance, rurality, poverty, and susceptible populations are the leading factors.

Part I: Factors Associated with the Rise in Prescription Opioids

Changes in Medical Practices Surrounding Pain Treatment

In the 1990s, the manner in which physicians viewed and treated pain began to change. In 1995, pain was introduced as the "fifth vital sign" to emphasize the importance of assessing patient

pain (Knight). Clinicians would determine a patient's pain by utilizing a series of faces, whose expressions demonstrated different pain levels (Knight). Physicians claim that in the "mid-1990s, they were encouraged to inquire about…pain…[and] to prescribe opioids with the goal of near-complete alleviation of pain symptoms," especially chronic non-cancer pain, due to the belief that there were "limited clinical resources allocated toward non-pharmacologic treatments" (Knight). Furthermore, "clinicians perceived that opioid prescriptions incentivized patients to engage in health care and/or adhere to other medications" (Knight). The shift to a focus on pain treatment in prescribing practices expanded the market for prescription opioids.

Big Pharma

> *"'We were impressionable young doctors, fresh meat with a lifetime of prescribing ahead…They took us golfing. It was standard to have a free lunch most days of the week because the drug companies were always buying, then you'd have a short educational seminar going on [about prescription drugs].'"*
>
> *– Steve Huff in Dopesick (Macy 34)*

OxyContin, developed and produced by Purdue Pharma, entered the market in 1996 as a prescription opioid to treat chronic pain (Van Zee). During this time period, pharmaceutical marketing efforts increased dramatically, as the market was 'hot' for prescription opioids (Knight). Purdue Pharma spent $200 million marketing OxyContin in 2001 alone (Van Zee). Purdue Pharma's marketing techniques incentivized doctors to prescribe OxyContin, which led to over-prescription. One such marketing technique included Purdue's all-expense paid trips for doctors, pharmacists, and nurses to "national pain management and speaker training conferences at resorts in Florida, Arizona, and California" (Van Zee). According to Art Van Zee, an MD who specializes in addiction medicine and practiced in a small coal mining town of Virginia, research shows that

these types of symposiums influence prescribing practice in favor of the sponsored drug (Van Zee). A second example of Purdue's marketing techniques included physician profiling, in which Purdue collected physicians' prescribing data and targeted physicians most likely to prescribe high volumes of pain relievers (Van Zee). As one physician recounts in Beth Macy's book *Dopesick*, "I did it myself, though I knew it was not the right thing to do. It was pushed on us big time, the idea that they can't become addicted if you're using opioids to treat legitimate pain" (Macy 34). Incentivizing sales representatives with large bonuses ensured that these targeted physicians were able to obtain plenty of OxyContin (Van Zee). Sales representatives also provided physicians with "'reminders' such as OxyContin branded clocks" for the exam rooms (Macy 32). Concentrated prescribing rates of OxyContin are evidence of the success of Purdue's targeted marketing. For example, "approximately 4 percent of prescribers in Florida accounted for 40 percent of the opioid prescriptions" in the state. Similarly, a study of Medicaid patients in Arkansas estimated that the "top 10 percent of prescribers accounted for 81 percent of opioid volume" (Chang).

In addition, Hsien-Yen Chang, professor of Health Policy and Management at Johns Hopkins, found that individuals who received opioid prescriptions from high volume prescribers "were more likely to receive higher doses and longer durations" (Chang). As explained in the next section of this chapter, longer and more potent prescriptions increases risk of addiction. Finally, Purdue employed a "patient starter coupon program" to give patients free time-limited prescriptions, which kept patients coming back for more (Van Zee). Purdue Pharma repeatedly stated that OxyContin was not addictive, and that patients had less than a 1 percent chance of becoming addicted (Van Zee). This proved not to be true. As a result of Purdue's aggressive, but extremely effective marketing campaign, OxyContin sales grew from $48 million in 1996 to almost $1.1 billion in 2000, and prescriptions skyrocketed from 670,000 in 1997 to 6.2 million in

2002 (Van Zee). Big pharma's aggressive promotion resulted in a market overflooded with prescription opioids.

Over Prescription, High-Dose Prescriptions, and Multiple Prescriptions

Opioid prescribing increased rapidly until 2011, followed by a reduction in opioid prescribing, which is attributed to increased awareness regarding the risk of opioid misuse (Piper 655). For example, by 2010, "enough prescription opioids were sold to medicate every adult in the US with a dose of 5 milligrams of hydrocodone every 4 hours for 1 month" (Keyes 53). However, opioid prescribing was not equally distributed across the nation. For example, in 2011, there was more than a fivefold difference between the highest prescribing (Rhode Island 2,623.7 MME/person[8]) and lowest prescribing (North Dakota 484.7 MME/person) states (Piper 654). In analyzing opioid prescribing in the US from 2006 to 2015, the Centers for Disease Control (CDC) found that "higher amounts of opioids were prescribed in counties with a larger percentage of non-Hispanic whites; a higher prevalence of diabetes and arthritis; micropolitan counties (town/city; non-metro); counties with higher rates of unemployment and Medicaid enrollment; lower educational attainment;…[and] higher suicide rates" (Guy 698). These differences across counties, and thus states, is a likely reason why states differ in terms of opioid misuse. This point is discussed in the second half of Chapter II.

Furthermore, studies have shown that the length and strength of prescriptions are associated with the risk of overdose and misuse, but no sustained benefits in terms of relief. One study found that higher opioid prescriptions predicted "lower rates of return to work and higher healthcare utilization" (Kobus 1132). Another study found that long-term opioid use is associated with initial

[8] Milligram Morphine Equivalent (MME) is a value assigned to opioids to represent their relative potencies.

exposure from high-dose prescriptions often given during emergency department visits (Penm, "Statewide" 6).[9] In addition, the risk of heroin use increases for those who were prescribed opioids in larger or longer doses (National Academies of Sciences, Engineering). Although there is no firm consensus regarding the point at which risk for misuse increases, the CDC recommends a prescription of three days or less (National Academies of Sciences, Engineering). In terms of prescription strength, studies find that prescriptions higher than 50 MME are associated with higher risks of adverse events, such as overdose (Hilliard 182). The CDC considers a daily dosage of 90 MME or higher to be high-dose (Guy 702).

Finally, the concept of doctor shopping, in which a patient visits multiple physicians in order to obtain more than one opioid prescription, is associated with greater risk of overdose. (National Academies of Sciences, Engineering). The fraction of patients who doctor shop for opioids is small; however, doctor shoppers account for a high share of opioid prescriptions (Chilcoat 221). One study found that the use of multiple opioid prescriptions is "associated with a six-fold increase in overdose" (Chang). Doctor shopping is also problematic because it imposes a "burden on prescribers who must determine if patients are seeking opioids for non-medical purposes" (Chilcoat 222).

Lack of Prescribing Physician Education

Although physicians were encouraged to prescribe opioids to address patient pain, according to expert research and physicians' opinions, most physicians were not educated about appropriate opioid prescribing practices or opioid addiction risk. A majority of states do not require pain management education for physicians (Parker 370). Notably, physicians prescribing opioids

[9] Since emergency department physicians do not regularly prescribe opioids long term, the study suggests that emergency department prescribing may initiate clinical "inertia," in which outpatient clinicians renew previous prescriptions" (Penm, "Statewide" 6). Renewing these prescriptions could indicate poor prescribing practices and a lack of clinician education (See the section on Lack of Education).

have made errors in MME calculations, underutilize prescription drug monitoring programs, and inconsistently monitor patient opioid use; all of which suggest a lack of proper physician training regarding opioid prescribing (National Academies of Sciences, Engineering). Though the "majority of Americans receive treatment for chronic non-cancer pain in primary care settings," experts believe that primary care physicians were not "sufficiently trained in pain management or addiction issues" (Knight; Van Zee). Additionally, primary care physicians have "the least amount of time for evaluation and follow-up of patients with complicated chronic pain" (Van Zee). Finally, the CDC finds that there is "substantial variation" in opioid prescribing at county levels, thereby suggesting "inconsistent practice" and a "lack of consensus" about opioid prescribing (Guy 698). Such variation in prescribing practices represents a lack of proper training and education for prescribing physicians.

Part II: Factors Influencing a State Population's Susceptibility to Opioid Misuse

Demographics

The demographic characteristic of those with the highest rates of opioid misuse are middle-aged, white-males. Initial opioid prescribing practices were most often targeted toward this group; however, over time, the opioid crisis has expanded to include other demographic groups. Opioids disproportionally affect middle-aged and older persons because this age group is most likely to experience chronic pain, and thus, receive more opioid prescriptions. According to the CDC, in 2016, opioid prescription rates were 28.9[10] per 100 persons for those aged 65 or older, 25.3 for those aged 45-54, 15.1 for those aged 20-24, and 11.6 for those aged 15-19 (Centers for Disease Control and Prevention 9). However, the 18 to 25-year old age group is the most likely to use opioids non-medically, meaning they are obtaining the medication illegally (National Academies

[10] Represents the rate for patients who had at least one opioid prescription filled.

of Sciences, Engineering). Additionally, according to the SAMHSA, most people who report prescription opioid misuse started using in their "early to late 20s" (National Academies of Sciences, Engineering).

Whites are the racial group most likely to overdose on opioids, followed by American Indians/Alaskan Natives, then African Americans (Hilliard 182). Since the introduction of pain as the fifth vital sign, racial disparities have existed regarding pain relief prescription. Research indicates that members of racial minority groups were undertreated for pain. Paul Hilliard, MD and opioid researcher at the University of Michigan, finds that patients "who report pain in the emergency department were more likely to receive an opioid if they were white (31 percent) than black (23 percent), Hispanic (24 percent), or Asian (28 percent)" (Hilliard 183). According to the CDC, physicians did not "trust people of color not to abuse opioids, so they prescribed them painkillers at far lower rates" (Macy 254). Although at the time this may have been considered unfair treatment of minorities, many were ultimately saved from opioid addiction.

Males have the highest rates of opioid overdose and are 59 percent more likely to overdose than women (National Academies of Sciences, Engineering; Hilliard 182). However, recent studies have found that "women are more likely to have chronic pain, be prescribed prescription pain relievers, be given higher doses, and use them for longer time periods than men" ("Opioid Addiction 2016 Facts and Figures"). Additionally, "women may become dependent on prescription pain relievers more quickly than men" ("Opioid Addiction 2016 Facts and Figures"). This is evidenced by opioid prescription rates, which according to the CDC, in 2016, were 16.4 per 100 persons for males and 21.8 per 100 persons for females (Centers for Disease Control and Prevention 9). According to SAMHSA, females are somewhat more likely to use prescription pain relievers than males: 38.8 percent compared to 33.9 percent (Hughes). As such, recent findings

suggest that there is now little difference between male and female prescription opioids use (Hughes).

Health Insurance Coverage

Those who have health insurance, especially Medicare or Medicaid, are more likely to have been prescribed prescription opioids. For example, a study found that between 2000 and 2005, the "use of short acting analgesics rose…191 percent in Medicaid" patients "without any significant change in the underlying population's prevalence of chronic pain" (Hilliard 185). The CDC reports that it found a positive correlation between opioid prescribing and Medicaid enrollment (Guy 698). A study on opioid prescribing effects in Kentucky also found a positive association between health insurance coverage and opioid prescriptions. In fact, their data indicated that "more than 90 percent of the opioid analgesic prescriptions in 2015 were paid by some type of health insurance" (Luu 105). Additionally, American insurance companies were more likely to cover opioids, which were cheaper and a "quicker fix" than "physical therapy, anti-inflammatories, biofeedback, or acupuncture" (Macy 29).

Rurality

According to the CDC, the "estimated rate of illicit drug use/prescription drug misuse in 2015 was 19.0 per 100 persons in large metropolitan counties" compared to "10.8 in non-metropolitan completely rural counties" (Centers for Disease Control and Prevention 12). However, the reverse is true for opioids. The opioid crisis has hit rural areas harder than metropolitan and urban areas. The CDC reported that "death rates from drug overdoses involving prescription opioids were 5.9 in noncore [rural] areas and 4.1 per 100,000 in large central metropolitan areas" (Centers for Disease Control and Prevention 21). Katherine Keyes, PhD and professor at Columbia University, hypothesizes that increased rates of opioid use in rural areas can

be attributed to greater opioid prescribing, an out-migration of young adults, economic stressors (poverty), and greater social and kinship network connections that may create drug use vulnerability (Keyes 52).

Evidence suggests that opioid prescribing varies from region to region, state to state, and county to county. For example, "sales data indicated that states with large rural populations, such as West Virginia, are among the highest prescribers of opioids," and the marketing of opioids was "more aggressive in rural communities…surrounding Appalachia" (Keyes 54). Additionally, data suggests that chronic pain and injuries are more common in rural areas, which is associated with increased opioid prescribing. This is partially due to the physically strenuous jobs often found in rural areas, especially in parts of Appalachia, such as coal mining. Furthermore, access to quality health care and other pain treatment options may be more limited in rural than urban areas, so prescription opioids may be the only available treatment option (Guy 701).

> *"OxyContin stood out more in rural America's distressed hollows and towns, where reps could easily target the lowest-hanging fruit – the jobless and people on disability, with Medicaid cards" (Macy 42).*

As noted in the demographics section of Part II, older adults are more likely to need medication for chronic pain. Rural populations are, on average, older than urban populations, suggesting another reason why rates of opioid use and potential misuse may be higher in rural areas (Keyes 54). Furthermore, the out-migration of young adults in rural areas may lead to "adverse economic conditions" because aging workforces typically have "less new economic infrastructure," and "economic downturns have more adversely affected rural areas in the" US (Keyes 54). Unemployment, which has also been linked to "greater vulnerability to drug use," has been higher in rural areas due to the decline of agricultural, manufacturing, and mining industries (Keyes 54;

Dew 16). Economic distress has also resulted in a rise in divorce, single parents and working mothers in rural areas (Dew 17). The rise in illicit rural drug use in rural areas as a consequence of economic strife and changes in family composition is consistent with previous research that supports the relationship between higher rates of drug use and "low socioeconomic status, marital instability, low parent-child bonding, and lack of parental monitoring" (Dew 17). Finally, according to Keyes, young adults who remain in economically deprived areas have a "greater accumulation of risk factors for problematic drug use" (Keyes 54).

Additionally, cultural drug use may ripple through a rural area more quickly than in an urban area due to social and kinship connections. As evidenced by one opioid user's recollection of his struggle with addiction in the HBO documentary "Addiction," living in a culture where drug use is apparent makes it easier to engage in that drug use – i.e. a community of a few, connected users encourages more to join, and "having a network of drug-using peers can inhibit one's ability to abstain from substance use" (Jonas 3). Similarly, "peer attachment was found to be the most significant predictor of substance abuse among rural 7th and 8th graders," which further emphasizes how social connections impact drug use (Dew 17).

The concept of social capital has also been used to explain drug use. Social capital is defined as "social organization, such as networks, norms, and social trust that facilitate coordination and cooperation for mutual benefit," and the fear of "social exclusion" which discourages people from breaking "community norms of trust" (Jonas 2). Research shows that social capital in Appalachia has declined in recent years due to economic struggle in the area leading to outmigration and de-unionization. As such, Adam Jonas of the University of Kentucky believes that OxyContin began to fill the gap in these communities as social capital. Jonas found that daily OxyContin users in Appalachia were "more likely to hold positions of high social

capital" (Jonas 9). According to SAMHSA's *Key Substance Use and Mental Health Indicators* report, about 53 percent of opioids are obtained from a friend or relative rather than a doctor (2016) (Ahrnsbrak 1). Thus, the often greater social and kinship network connections in rural areas allow for increased opioid sharing and transfer between relatives and friends as a form of social capital, albeit a negative form, thereby creating a culture of illegal opioid markets. As one woman recounts, "'she bought pills from people who paid one dollar for their OxyContin prescriptions using their Medicaid cards'" (Macy 42). Keyes has found that opioid-related drug deaths among non-medical users is higher than opioid-related drug deaths among medical users in rural areas, which may reflect the tight social and kinship networks in rural areas that allow for the increased illicit spread of prescription opioids (Keyes 52).

Poverty

As previously mentioned, poverty is associated with drug abuse. Christopher Carpenter, professor at Vanderbilt University, finds that economic downturns coupled with a large percentage of 31 to 64-year old white males with low educational attainment leads to the increased use and misuse of opioids (Carpenter 64). Further, the stress of losing a job has been tied to increased demand for opioids, and there is a "negative relationship between per-capita GDP and analgesic disorders" (Carpenter 69). Christos Grigoras, senior research assistant at the Warren Alpert Medical School of Brown University, found that county poverty rates were correlated with opioid prescription rates and opioid related deaths (Grigoras 119). Finally, poverty is not only a potential cause of opioid use, but opioid use also perpetuates poverty; thus, creating a feedback loop. Between 1999 and 2015, the increase in opioid prescriptions can account for a 1.4 and 1.8 percent decline in prime-age male and female labor force participation, respectively, over that period (Gitis).

At Risk Populations: Those Who Previously or Currently Use Drugs, Have Mental Illness, and Those Involved in the Criminal Justice System

People who are existing drug users are more likely to misuse prescription opioids. For example, a study finds that "5.9 percent of past year alcohol users also misused prescription pain relievers;" of "heroin users aged 12 or older, 72.1 percent misused prescription pain relievers;" and "16.2 percent of marijuana users aged 12 or older also misused prescription pain relievers" (Hughes). Furthermore, 46 percent of patients with a positive toxicology denied illicit drug use during research interviews despite guaranteed anonymity, suggesting that "patients with chronic pain often mislead physicians about illicit drug use" (Fleming 580).

People with existing mental illnesses, such as depression, are more likely to use opioids nonmedically (Keyes 52). According to the 2015 National Survey of Drug Use and Health (NSDUH), among adults who had any mental illness, 11.1 percent misused prescription pain relievers, and among adults who had serious mental illness, 15.2 percent misused prescription pain relievers (Hughes). Conversely, adults without any mental illness were less likely to have misused prescription opioids (Hughes). Finally, studies find that those involved in the criminal justice system are at higher risk of opioid misuse and have a high risk of overdose during the first two weeks of prison release due to their loss of tolerance, social isolation, and high relapse rates (National Academies of Sciences, Engineering).

Part III: Discussion of States with High and Low Opioid Overdose Rates

West Virginia

West Virginia has consistently had the highest opioid overdose rate in the US, and the state presents many of the risk factors discussed above. Although, it is difficult to pinpoint the exact causes of West Virginia's high rate of opioid overdose, these factors above have likely

contributed to West Virginia's opioid problem. As of 2016, West Virginia's age-adjusted opioid overdose rate was 52 per 100,000 people[11] ("Drug Overdose Death Data"). In 2015, West Virginia also had a prescription rate of 1,008.1 MME of opioids prescribed per capita, well above the national average of 642 MME ("Opioid Summaries by State"). Additionally, West Virginia's rate of opioid prescriptions per 100 persons was consistently well above the national average every year from 2006 to 2015. Kanawha, Cabell, Raleigh, Mercer and Berkeley counties in West Virginia represented 41 percent of the opioid overdoses in West Virginia from 2001 to 2015, and in 2000, Cabell, Raleigh, Mercer, and Berkeley counties had some of the highest rates of opioid prescriptions in West Virginia (Van Zee). These four counties averaged prescriptions of OxyContin, oxycodone, and hydrocodone of 31,466 grams per 100,000 persons as compared to the US average of 10,594 grams per 100,000 persons for the same drugs (Van Zee). These statistics further demonstrate the connection between opioid prescription rates and opioid overdose rates.

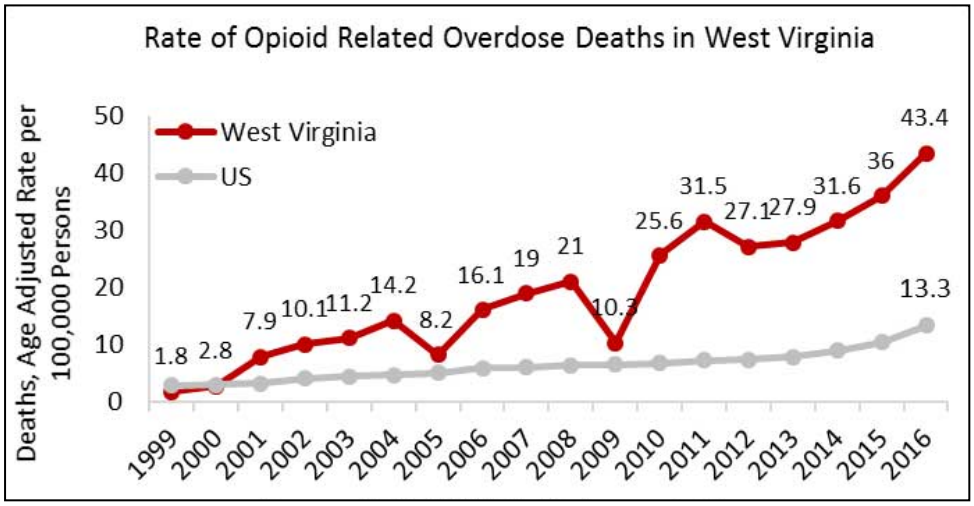


Fig. 1 (Source: "Opioid Summaries by State")

[11] Opioid overdose death rate includes illicit and prescription opioids. This footnote applies to all opioid overdose death rates reported in this paper. The rise in illicit opioid use as a consequence of OUD from prescription opioids is discussed in Chapter III.

West Virginia's high opioid prescription rate may reflect its population's higher than average enrollment in Medicaid and Medicare, lower than average rate of uninsured persons, and high rate of whites as a percentage of the population ("Health Insurance Coverage of the Total Population"). West Virginia was also one of the first geographical areas Purdue Pharma targeted in the 1990s (Luu).

Coal mining is a common occupation in rural West Virginia, and as noted above, is a profession prone to injuries that lead to chronic pain. As such, West Virginians injured in coal mining are likely to receive opioids as treatment. John Temple, a professor at West Virginia University, explains that there are few doctors in mining camps, so the "'doctor [who is there] is going to be more likely to opt for the quick fix and give people pills…[to] get them back into the mine'" (Jacobs). As coal mining jobs disappear, unemployment rates and substance abuse have increased in West Virginia. As of 2016 and 2017, West Virginia's poverty rate and unemployment rate exceeded the national average ("Distribution of Total Population by Federal Poverty Level"). Dr. Matt Cupp, a primary-care doctor in West Virginia says that, "'when times get slow…a lot of [West Virginians] will turn to alcohol, tobacco, illegal drugs and get high for recreation,'" although there has been a definite shift towards prescription pain killers as the primary choice of drug (Jacobs). For example, at West Virginia University, addiction program patients have shifted from "90 percent alcoholism in the 1990s to between 90 percent and 95 percent prescription painkiller addiction by 2002" (Jacobs).

Concerning mental illness as a category of at-risk populations, West Virginia had a higher rate of mental illness compared to the national average ("2015-2016 National Survey on Drug Use and Health"). Finally, West Virginia has experienced an out-migration of young adults, resulting in an older population that is more likely to receive prescription opioids. For example, Keyes found

that according to the 2010 Census, there were twice as many West Virginians aged 65 and older as those aged 18 to 24; however, in 1970, these age groups were approximately equal in size (Keyes 54). The combination of the above risk factors suggests why West Virginia has the highest rate of opioid overdose in the country.

Ohio

Ohio has also consistently ranked within the top five states for opioid overdoses. As of 2016, Ohio's opioid overdose rate was 39.10 per 100,000 people on an age adjusted basis, making it the second highest state in opioid overdoses ("Drug Overdose Death Data"). From 2006 to 2016, Ohio's prescription opioid rate per 100 persons was above the national average every year ("Opioid Overdose"). Like West Virginia, Ohio's high opioid prescription rate may reflect its population's higher than average enrollment in Medicaid and Medicare, lower than average rate of uninsured persons, and high rate of whites as a percentage of its population ("Health Insurance Coverage of the Total Population"). As of 2016, Ohio's poverty level exceeded the national average, and, as of 2017, so did its unemployment rate ("Distribution of Total Population by Federal Poverty Level"). These findings are consistent with the discussion in Part II concerning the positive correlation between opioid overdose and poverty and unemployment.

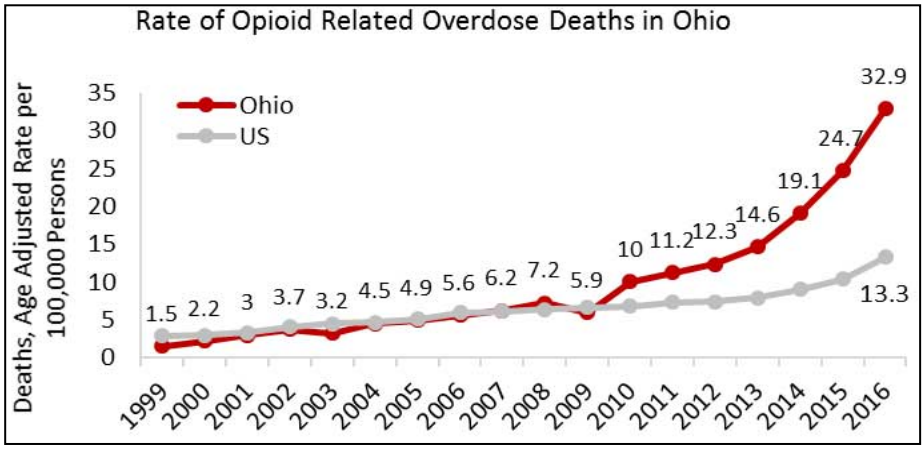


Fig. 2 (Source: "Opioid Summaries by State")

The rate of naloxone[12] administration is another method utilized to track opioid misuse. According to Rick Massatti from the Ohio Department of Mental Health and Addiction Services, naloxone administration rates from 2003 to 2012 were higher among men than women and higher among whites compared to other races (Massatti 11). This is consistent with the demographic factors associated with the opioid crises as discussed in Part I and reflects the findings that these groups are most likely to abuse opioids.

Regarding at risk populations, a 2009 study in Ohio found that those who reported using pharmaceutical opioids were more likely to have also reported using other pharmaceutical and illicit drugs (existing drug users) or have depressive symptoms (Daniulaityte 651). Ohio also has a higher percentage of those with mental illness compared to the national average ("2015-2016 National Survey on Drug Use and Health").

Erin McKnight, assistant professor at The Ohio State University College of Medicine, notes that Ohio blames its neighboring states, such as West Virginia and Kentucky, for its opioid overdose problem. West Virginia and Kentucky are among the top five states with the highest rates of prescription pain relievers prescribed per person (McKnight 303). For example, in 2016, "Northern Kentucky was designated as a High Intensity Drug Trafficking Area by the Department of Justice" (Q. Johnson 382). It is possible that residents of southern Ohio obtain prescriptions in these states; however, since Ohio's prescription opioid rate is also higher than the national average, these states could just as easily blame Ohio for their opioid problem (McKnight 303).

New Hampshire

New Hampshire is a seemingly unlikely candidate for a high opioid overdose rate given the state's "relative prosperity," but New Hampshire had the third highest age-adjusted rate of

[12] Naloxone is a medication used to reverse an opioid overdose.

opioid overdose as of 2016 at 39 per 100,000 persons (Seelye; "Drug Overdose Death Data"). Katharine Seelye, writer for the *New York Times*, notes that New Hampshire has the "highest median household income in the country [and] ranks low in unemployment and crime." Although poverty and unemployment may be factors contributing to high opioid overdose, they cannot be the only factors, as evidenced by New Hampshire. However, New Hampshire, like all states, has "pockets of 'economic degradation,' especially in rural areas where jobs are few," which "contribute to the problem [opioid misuse]" (Seelye). Likewise, according to Casey Leins, writer for *U.S. News & World Report*, these rural areas have "'tight-knit communities where drug use is a social phenomenon.'" In this regard, New Hampshire is similar to other high opioid overdose states in terms of poverty, unemployment, and rurality.

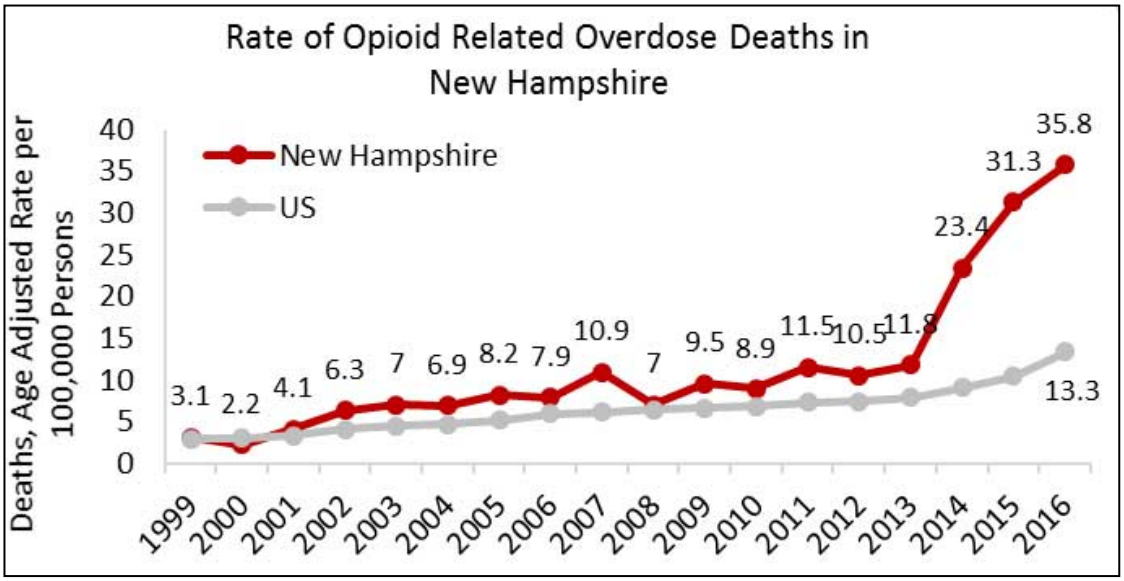


Fig. 3 (Source: "Opioid Summaries by State")

In 2015, New Hampshire had a prescription rate of 775.5 MME of opioids prescribed per capita, higher than the national average of 642 MME ("Opioid Summaries by State"). However, from 2006 to 2015, New Hampshire had prescription opioid rates per 100 persons that were consistently lower than the national average ("Opioid Overdose"). In other words, New Hampshire

had fewer prescriptions per person compared to the national average, but individual prescriptions had more milligrams of opioids. Because New Hampshire's MME was higher than the national average MME, while the number of prescriptions per 100 persons were lower than the national average number of prescriptions per 100 persons, this suggests prescriptions in New Hampshire were high-dose or long-term ("Opioid Overdose"). Additionally, researchers at Dartmouth University blame New Hampshire's "abundant drug supply" on neighboring Massachusetts, which is a hub for "drug distribution networks that traffic opioids throughout New England" (Seelye).

Dartmouth College researchers also believe that the state's "Live Free or Die" motto and attitude might justify risky behavior, such as prescription drug use (Seelye). Although there are no studies to back this claim, common social attitudes impact drug use, as discussed in Part II, and strong social connections may lead to common group behavior. Additionally, Raymond Brown, writer for the *Wall Street Journal*, claims that New Hampshire is one of the least churchgoing states in the nation, which he believes is associated with state's addiction crisis. According to Brian Dew, chair of the Department of Counseling and Psychological Services at the College of Education & Human Development for Georgia State University, religion is an important influence on drug use "resiliency" in rural America because religion promotes "prosocial outcomes, which deter persons from substance abuse" (Dew 17). Dew cites that "nonusers commonly report being more religious than users," and religiosity among family is associated with lower substance abuse rates (Dew 18). A 2014 Pew Survey confirms that New Hampshire is among one of the least church going states ("Attendance at Religious Services by State"). The Pew survey also shows, however, that Kentucky, Ohio, and West Virginia's populations, as a whole, were more church going than

the national average, but despite their relative religiosity[13], each of these states has a pressing opioid problem. ("Attendance at Religious Services by State").

Pennsylvania

As of 2016, Pennsylvania's age-adjusted opioid overdose rate was the fourth highest in the nation at 37.9 overdoses per 100,000 people on an age adjusted basis ("Drug Overdose Death Data"). Figure 4 shows that Pennsylvania has not historically been in the top five opioid overdose states; however, the sharp increase in opioid overdoses from 2015 to 2016 propelled it into the top five. As of 2015, Pennsylvania's opioid prescription rate was 781.4 MME, above the national average of 642 MME ("Opioid Summaries by State"). However, from 2006 to 2016 Pennsylvania's prescription rate per 100 persons was consistently below the national average ("Opioid Overdose"). This may explain why Pennsylvania historically did not have a high rate of opioid overdose deaths, although it does not clarify why Pennsylvania's overdose death rate jumped from 2015 to 2016. A potential explanation for the sharp increase in the opioid overdose death rate from 2015 to 2016 is the increase of heroin and fentanyl use (See Chapter III). For example, in Philadelphia, the number of deaths involving fentanyl increased by 412 from 2012 to 2016 (*The Mayor's Task Force to Combat The Opioid Epidemic in Philadelphia* 8). Further, Philadelphia, and the state as a whole, is at risk for heroin use because heroin is "pure" and "cheap" in the state (*The Mayor's Task Force to Combat The Opioid Epidemic in Philadelphia* 7).

[13] Religiosity of each state was determined by the percent of the population that "attends church at least once a week" in comparison to the national average ("Attendance at Religious Services by State").

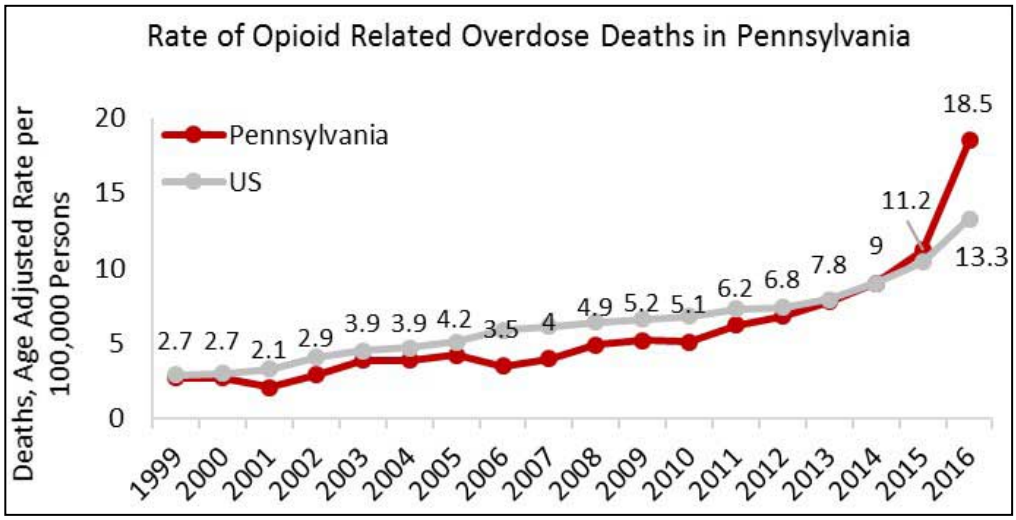


Fig. 4 (Source: "Opioid Summaries by State")

The majority of Pennsylvania counties are classified as rural (48 rural versus 19 urban) ("Rural / Urban PA"). Overdose deaths in rural counties of Pennsylvania have increased by 42 percent, compared to a 34 percent increase in urban counties (2016, "Pennsylvania's Opioid Epidemic"). This finding parallels the discussion regarding rural areas above. In Philadelphia, Pennsylvania, of those who died from a drug overdose from 2010-2015, 25 percent had been incarcerated at least once in this time frame (*The Mayor's Task Force to Combat The Opioid Epidemic in Philadelphia* 11). Although this statistic does not specifically reference opioids, it does suggest that those involved with the criminal justice system are a susceptible population, as explained in Part II. Thus, an area with a high prison population, may have higher drug overdose rates, and Pennsylvania has a higher concentration of incarcerated individuals compared to the national average (2016, "Total Population in U.S. Adult Correctional Systems by Correctional Status").

Similar to several other states with high opioid overdose rates, Pennsylvania has faced economic hardship due to the decline of the steel production industry (Dasgupta 184). This is

reflected in Pennsylvania's unemployment rate which exceeded the national average as of 2017 ("Unemployment Rate"). Steel industry workers in Pennsylvania have cited economic hardship and "hopelessness" as reasons for drug use (Dasgupta 184). Further, Pennsylvania's private industry injury incidence rate exceeded the national average in 2016, which may reflect higher opioid prescription rates in recent years ("State Occupational Injuries, Illnesses, and Fatalities").

Kentucky

As of 2016, Kentucky's age-adjusted opioid overdose rate was the fifth highest in the nation at 33.50 overdoses per 100,000 people ("Drug Overdose Death Data"). In 2015, Kentucky's opioid prescription rate was 860.4 MME, more than the national average of 642 MME ("Opioid Summaries by State"). Kentucky possesses many of the previously identified risk factors for high opioid prescribing: a lack of alternative treatments for chronic pain in Kentucky's rural areas; higher than average enrollment in Medicaid and Medicare; lower than average rate of uninsured persons; and a high rate of whites as a percentage of its population ("Health Insurance Coverage of the Total Population"; "Population Distribution by Race/Ethnicity"). Further, Huong Luu, of the Injury Prevention and Research Center at University of Kentucky, found that Appalachian regions of Kentucky, which are the areas most heavily affected by opioid misuse, had lower levels of educational attainment, lower average median income, higher unemployment, higher percentages of population aged 55 or older, and higher rates of emergency department visits (Luu 104-105). Kentucky residents also have a higher percentage of mental illness than the national average, and those with mental illness are more susceptible to opioid misuse ("2015-2016 National Survey on Drug Use and Health").

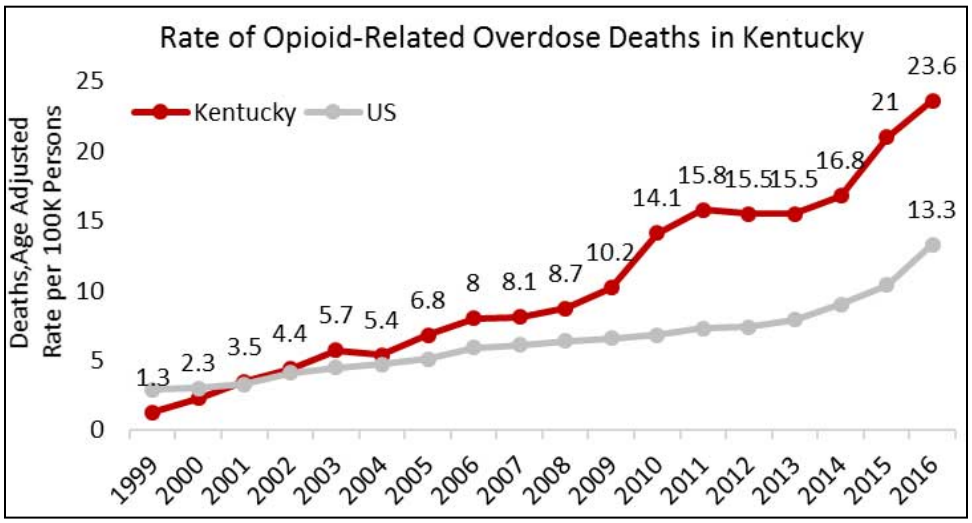


Fig. 5 (Source: "Opioid Summaries by State")

Kentucky has a large rural population, with 71 percent of the state classified as rural (2016), and historically relies on heavy industry as a primary source of employment ("Population Distribution by Metropolitan Status"). The physically strenuous coal mining, logging, and trucking industries produce a high percentage of work-related injuries that result in chronic pain and serious injury. As such, Kentucky, was one of the first geographical areas targeted by Purdue Pharma in the 1990s. Consistent with this, prescriptions were historically 33 percent higher in non-metro Kentucky counties (2012-2015) (Luu 103). Additionally, some workers self-medicate by getting medication from friends and family to tolerate the physical demand of work, which means they are using opioids without a doctor's supervision (Ceniceros). Unsupervised prescription opioid use is risky, and can lead to overdose.

Just as Ohio blames its proximity to Kentucky as a potential cause for Ohio's opioid problem, Kentucky suggests that its proximity to Ohio, specifically Cincinnati, may be a cause of Kentucky's opioid problem (Q. Johnson 385).

Low Overdose States: Nebraska, South Dakota, Texas, North Dakota, Iowa

The five US states with the lowest rates of opioid overdoses, as of 2016, from lowest to highest, are Nebraska, South Dakota, and Texas, followed by a tie between North Dakota and Iowa. On an age adjusted basis, Nebraska's opioid overdose rate was 6.4 per 100,000 population, South Dakota's was 8.4, Texas' was 10.1, North Dakota's was 10.6, and Iowa's was 10.6 ("Drug Overdose Death Data"). However, Mary Huber, writer for *Austin-American Statesman*, cites that Austin city officials believe that drug overdose death rate data does not accurately gauge the drug problem in Texas due to underreporting and misreporting. There are 254 counties in Texas and only 13 medical examiners (Huber). Furthermore, "some justices of the peace record a death as 'cardiovascular' without specifying whether illicit or prescription drugs were a factor" (Huber). Marcia Ory, Chair of the Texas A&M Health Science Center Opioid Task Force, suggests this is because family and friends may want to hide drug use so that not everyone in the community knows (Austin). These arguments may extend to the other states as well.

From 2006 to 2016, Nebraska, South Dakota, Texas, North Dakota, and Iowa's opioid prescription rates per 100 persons were consistently well below the national average, suggesting another potential explanation for why these states have lower opioid overdose rates ("Opioid Overdose"). Although there is no firm explanation for why each of these states have lower opioid prescription rates, possible hypotheses are that physicians in these states were not as heavily targeted by Purdue Pharma, as they are, on average, farther from Purdue's corporate headquarters in Connecticut, or that other pain treatments were more readily available, both of which may have made prescription opioids less readily available. Regarding potential connections between work place injury and opioid prescribing to relieve chronic pain associated with these industries, 2016 Bureau of Labor Statistics data indicate that private industry's injury rates in the low overdose

states were on average lower than the rates in the highest overdose states, all of which were well above the national average rate of work place injury[14] ("State Occupational Injuries, Illnesses, and Fatalities").

In 2016, North Dakota and Texas had lower rates of Medicaid and Medicare enrollment rates compared to the national average, which may be another reason why these states have lower rates of opioid prescriptions ("Health Insurance Coverage of the Total Population"). In addition, Texas has had a very high rate of uninsured persons compared to the national average, while other low overdose states' rates of uninsured persons were similar to the national average. Texas' high rate of uninsured and low rate of opioid overdose is consistent with the idea that those with insurance, especially Medicaid or Medicare, are more likely to receive opioid prescriptions for chronic pain. However, insurance rates consistent with the national average in the other four low overdose states present an inconsistency in this factor.

Interestingly, data show that Texas' opioid overdose death rate is concentrated in North and East Texas along the Red River (Stelter). Perhaps opioid overdose death rates are higher in this region of Texas because of its proximity to Oklahoma, where opioid prescription rates are much higher. In 2016, Oklahoma's opioid prescription rate was the fourth highest in the nation at 1,026.10 MME, well above the national average of 642 MME ("Opioid Summaries by State"). Suggesting supply from neighboring states is an argument advanced by several high opioid overdose states.

In terms of populations at risk for opioid misuse, the rate of mental illness, was also lower than the national average in four of the five of the lowest overdose states, while Nebraska, was nearly equal to the national average ("2015-2016 National Survey on Drug Use and Health").

[14] No data was available for the following states: New Hampshire, South Dakota, and North Dakota.

Furthermore, except for Texas, which has a high concentration of incarcerated individuals, the other four states had lower concentrations of incarcerated individuals than the national average. However, of the five states with highest levels of opioid overdose, West Virginia, New Hampshire, and Kentucky also had lower than average concentrations of incarcerated individuals (2016, "Total Population in U.S. Adult Correctional Systems by Correctional Status"). Therefore, although those involved in the criminal justice system may be at higher risk for opioid misuse, this may not be a major contributing factor to a state's overall rate of opioid overdose; perhaps because the percentage of incarcerated individuals is a fairly low portion of each state's population.

As of 2017 and 2016, respectively, each of the five low overdose states had lower unemployment and poverty rates compared to the national average, indicating less economic distress, while the states with the highest rates of opioid overdose, except New Hampshire, had unemployment rates higher than the national average, indicating more economic distress ("Distribution of Total Population by Federal Poverty Level"; "Unemployment Rate"). This suggests that unemployment and economic distress may contribute to opioid misuse and overdose.

Regarding educational attainment, each of the five lowest overdose states, except Texas, had above average educational attainment for at least two of the three following measures: "no high school diploma[15]," "high school or high school equivalent," and "bachelor's degree or higher" (2016, "Current Population Survey"). However, of the high overdose states, New Hampshire, Ohio, and Pennsylvania also had above average educational attainment for at least two of the three same measures.

In terms of rurality and race, each of the five low overdose states, except Texas, had a higher percentage of non-metropolitan areas and whites as compared to the national average

[15] This represents the proportion of people in the state who do not have a high school diploma. To be considered "above average" in this category a state should have a rate *lower* than the national average.

("Population Distribution by Race/Ethnicity" (2017); "Population Distribution by Metropolitan Status" (2016)). The majority of the low overdose states' non-metropolitan area and white race percentages are similar to the percentages of the high overdose states. Therefore, although rural areas and whites are at higher risk for opioid prescription and misuse, these cannot be the only factors affecting a state's rate of opioid overdose deaths. Referring to the idea of social capital discussed in Part II, it could be that a different form of social capital exists in these low overdose states, such as service organizations, community sports teams, or religious groups; thus, prescription opioids do not serve as a form of social capital in these areas, unlike the rural areas of the higher overdose states (Putnam 22-24). In fact, North Dakota, South Dakota, Nebraska and Iowa are regarded has having some of the highest social capital in the nation (Putnam 311).

Part IV: Chapter Conclusion

Though causal relationships have not been established, this discussion has identified factors that may be associated with states' opioid overdose deaths. Rather than a single factor, a confluence of factors may lead to high rates of opioid overdose. Similarly, no one factor may save a state from high rates of opioid overdose. In summary, the following factors are associated with opioid misuse, and by extension, overdose: high prescription rates, commonly associated with rurality and industrial work resulting in chronic pain; demographics, particularly white, older males; insurance, particularly Medicare and Medicaid, which corresponds with aging populations and poverty, respectively; as well as educational attainment; and at-risk populations. As discussed above, the majority of the high opioid overdose states (West Virginia, Ohio, Pennsylvania, and Kentucky) present a majority of these factors. The reverse is true for the low overdose states, Nebraska, South Dakota, Texas, North Dakota and Iowa. Despite this, some states, like New Hampshire, appear to be exceptions. For example, New Hampshire is not a particularly

impoverished state, has below average unemployment, high level of educational attainment, historically low prescription rates, and a fairly non-rural population distribution. However, factors, such as tight-knit rural communities, its rebellious spirit, and its proximity to Massachusetts, which is a high drug trafficking area, may contribute to its high opioid overdose death rate.

Chapter III: Policy Initiatives Designed to Combat the Opioid Crisis

Having identified factors associated with the rise of the opioid crisis, this chapter focuses on policies utilized to combat the epidemic. Part I provides an overview of the most common policy responses used by US states. Part II discusses barriers to successful policy implementation, and Part III examines each of the five high opioid overdose states discussed in Chapter II to assess which of the common policies have been implemented. This section attempts to elucidate how effective these states have been at combating the crisis and provide recommendations regarding how states could improve their responses. Federal policy responses to the crisis are critical to US recovery from this crisis; however, this chapter focuses on state policy, as this is the primary emphasis of this thesis. A brief overview of federal policy is discussed below to explain the difference in purpose between federal and state policy.

Federal policy provides guidance for oversight, regulation, and enforcement that is carried out through various regulatory agencies, while states deal with the "brunt" of the crisis by implementing solutions (Soelberg 1676). Examples of regulatory agencies' involvement with opioid response policy include: The Department of Health and Human Services' five-point Opioid Strategy to provide an overarching framework for combating the crisis (Collins); the Drug Enforcement Agency's (DEA) work to reduce opioid supply by shutting down illegal 'pill mills',[16] and enforcing stricter heroin and fentanyl trafficking laws (Soelberg 1678); the Food and Drug

[16] "Pill mill" is a term for clinics that prescribe or dispense opioids without a "legitimate purpose" or in a manner that is "inconsistent with standard medical practice" (Penm, "Strategies" 3).

Administration's (FDA) regulations on medications and prescriptions, such as converting medications from prescription status to over-the-counter (OTC) status. In particular, the FDA enforced the reformulation of OxyContin to make it more difficult to abuse. Furthermore, it is within the FDA's purview to change the status of naloxone to OTC in order to make it more available. However, the FDA has yet to do so. The states are able to respond by enacting state legislation that makes naloxone more readily available (Soelberg 1676). The Centers for Disease Control and Prevention (CDC) control the spread of disease and addresses a variety of health issues through public health data collection and reporting. For example, the CDC released its "Guidelines for Prescribing Opioids for Chronic Pain" to promote safe prescribing (Soelberg 1677). The Substance Abuse and Mental Health Services Administration (SAMHSA) strives to "reduce the impact of substance abuse and mental illness of America's communities" by providing funding to states in need (Collins). For example, SAMHSA administers the Opioid State Targeted Response grants created by the 21st Century Cures Act (Collins).

Perhaps the most important piece of federal legislation passed to combat the opioid crisis is the Comprehensive Addiction and Recovery Act (CARA 2016) enacted under the Obama Administration. According to Macy, however, the administration was "tepid" and "slow" in addressing the crisis (Macy 281). Some of the act's most salient provisions are: improving overdose treatment access and reversal medications through federal grants to states; expanding access to opioid and heroin treatment centers and medication assisted treatment (MAT) through federal grants to states; decreasing regulations regarding MAT treatment, such as enabling nurse practitioners and physician assistants to prescribe buprenorphine; and authorizing grants for states to establish opioid response plans that include education relating to opioid use, treatment options,

and creation of prescription drug monitoring programs. In October 2017, President Trump declared the opioid crisis a national public health emergency.

Part I: Overview of Common Policy Responses

The following Part I of this chapter presents an overview of policies implemented at a state level to curb the opioid crisis.

As defined by the Surgeon General's office, policy responses to the opioid crisis can be explained as a three-prong strategy. First, Primary Prevention aims to *prevent* the start of substance use, misuse, or addiction by "target[ing] risk factors and enhance[ing] protective factors" (U.S. Department of Health and Human Services 8). This includes school education regarding substance abuse, connecting youths with mental and behavioral community health providers, and parental engagement. The second strategy, Secondary Screening and Early Intervention, involves identifying early users and interfering. The Surgeon General's office explains that "primary care has a central role in this process," and clinicians should screen adults for alcohol use, which may provide a gateway to asking about other substance misuse, such as opioids (U.S. Department of Health and Human Services 16). The final strategy, Tertiary Treatment and Management of OUD, is "designed to help individuals stop or reduce harmful substance misuse, improve their health and social function, and manage their risk for relapse" (U.S. Department of Health and Human Services 17). Policy responses discussed below are arranged according to this methodology, beginning with Primary Prevention; although policies do not always fit strictly into one category.

Primary Prevention Policies

Primary Prevention focuses on thwarting an addiction before it starts through education for health care professionals, youths, and the community. It is based on the belief that increased consumer education and "sophistication" about opioids leads to more caution and hesitation in

experimenting with opioids (Parker 370). Examples of public education include campaigns through community events, websites, and TV commercials. Campaigning messages vary and include personal stories of those affected by OUD, demonstrations of the risks and harms associated with OUD, or messages to reduce stigma surrounding OUD (Parker 370). Unfortunately, many studies find that drug education does not have a significant impact (Parker 370). Regardless, the 21st Century Cures Act provides $1 billion in funding across all states for prevention education campaigns (Parker 370).

Primary Prevention also includes decreasing the available drug supply through punitive trafficking laws. Since 2011, 16 states have increased sentencing terms for heroin, fentanyl, and opioid trafficking. According to Parker, these laws face a "great deal of criticism from the public health and medical community" because they "prosecute the last person to touch the drug, rather than the 'kingpins' responsible for wide-spread distribution of illicit opioids" (Parker 373). However, Parker also acknowledges that failing to prosecute mid-level dealers would lead to more "rampant" drug sales and misuse (Parker 374). Litigation and disciplinary policy extend beyond traffickers to also target the sources of opioids, including manufacturers, distributors, retailers and prescribers, such as the numerous lawsuits against Purdue Pharma (Parker 375). At the same time, states have reduced punishments for users found with possession of opioids (Parker 373). States hope that less severe punishments for possession will encourage people to seek treatment. Although, the line between traffickers and users can "blur," complicating sentencing (Parker 374).

Secondary Screening and Intervention

Prescription Drug Monitoring Programs

Prescription drug monitoring programs, commonly referred to as PDMPs, are state databases used to track patient prescription information so physicians can cross reference patients'

current and past prescriptions. The first PDMPs were implemented as early as 1973 (Grecu). PDMPs help to ensure that a patient is not receiving multiple prescriptions from multiple providers, i.e. doctor shopping (Parker 369). PDMPs also allow physicians to discern potential patterns of prescription drug misuse (Parker 369). They can also serve as a public health surveillance tool to enhance public safety (U.S. Department of Health and Human Services 17).

Despite their potential, PDMPs are not utilized equally across states. States policies regarding mandated PDMP use and timely reporting differ. As of 2017, all 50 states had established PDMPs, but only 23 states mandated that prescribers and dispensers (such as pharmacists) enroll with their respective state's PDMP (Parker 369). Only 13 states required prescribers and dispensers to consult the PDMP before writing or filling a prescription, and 18 states did not require either prescribers or dispensers to reference the PDMP (Parker 369). As such, PDMP effectiveness differs by state policy (Parker 369). One study finds that implementing a PDMP is associated with a 30 percent decrease in opioid prescribing (Parker 369). Another study finds that state policies that mandate registering with the state PDMP are associated with a 10 percent greater decrease in opioid prescribing compared to states that do not mandate registering with the state PDMP (Parker 369). Further, mandated use of PDMPs has been found to be associated with "a reduction in treatment admissions for abuse of cocaine and marijuana, both known opioid complements in consumption" (Grecu). States that do not require mandated use of the PDMP face low PDMP utilization rates, usually around 14 to 25 percent, because prescribers are "pressed for time" and the database is not "well-integrated" into the electronic system of many prescribers' practices (Grecu).

Effectively utilizing PDMPs can reduce the amount of excess prescription opioids in circulation, as well as prevent over-prescribing to particular individuals, which may prevent them

from developing OUD. However, merely restricting access to prescriptions has not been a proven solution for assisting those with existing OUD. As described in Chapter I Part II, restricting supply to those with OUD may compel them to illegally appropriate prescription opioids, or use illicit substitutes such as heroin or fentanyl, perpetuating the epidemic. Accordingly, prescribers who utilize PDMPs should be able to refer patients to appropriate addiction treatment programs.

Prescription Limits

Research demonstrates that the longer an opioid is prescribed and the higher the dosage, the greater the risk for developing OUD. In response, state governments have enacted prescription limit policies as a way to restrict the length and intensity of a prescription. As explained in Chapter II Part I, there is no firm consensus regarding the point at which risk for misuse increases, but the CDC recommends a prescription of three days or less (National Academies of Sciences, Engineering). In terms of prescription strength, studies find that prescriptions higher than 50 MME are associated with higher risks of adverse events, such as overdose (Hilliard 182). The CDC considers a daily dosage of 90 MME or higher to be high-dose, and recommends exercising "caution" when prescribing doses above the 50 MME and 90MME thresholds (Guy 702; Kertesz).

In 2016, Massachusetts became the first state to legislate a prescription limit (seven days) for new opioid prescriptions (Parker 369). This seven-day limit has become the "common benchmark" nationwide, although limits vary from three to 14 days (Parker 369). Opponents of prescription limits argue that these policies "undermine patient care" because they "interfere with doctors' ability to create appropriate, individualized treatment plans" (Parker 369). Additionally, Stefan Kertesz, a researcher at the University of Alabama, argues that MME thresholds are misconceived because 86 percent of overdose events occur at less than 90 MM. Kertesz also states that high dose prescription amounts have fallen by 48 percent over the past six years, yet the

"decline does not appear to have reduced overdose events." Kertesz continues to explain that overdose reports in 2016 and 2017 are marred by patients who have "committed suicide, attacked physicians, died in withdrawal, suffered medical decline or overdosed on illicit opioids" due to prescription reduction or truncation (Kertesz). However, Kertesz does concede that a "lower dose ought to be safer than a high dose, all things being equal." Other experts share similar sentiments and there is much data to support these beliefs.

Therefore, prescription limits may serve as a way to prevent developing OUD, but may be harmful to those who already have OUD. This suggests the importance of addiction treatment policies for those with OUD. Additionally, prescription limits will not be effective unless paired with effective PDMP use; otherwise, a patient may doctor shop. Here lies the delicate balance between helping patients overcome OUD and turning patients to illegal forms of opioids, physical and mental deterioration, or even suicide.

Drug Drop Boxes and Take Back Programs

Due to aggressive opioid prescribing, (which regulations such as PDPMs and prescription limits are attempting to curb), it is estimated are that that three-fourths of opioid prescriptions go unused (Macy 271). Drug drop boxes and take back programs serve to get extra and unused prescription opioids out of public circulation. At a box or take back program, an individual can safely dispose of unwanted drugs. Many police stations and pharmacies have boxes that are accessible daily. Federal and state governments are raising awareness about such boxes through programs like "National Take Back Day," which the Drug Enforcement Administration holds twice a year (Parker 371). Unfortunately, these programs are "unlikely to significantly reduce the prescription opioid supply," as a study in Kentucky found that in one year only .3 percent of all drugs prescribed that year were collected (Parker 371).

Abuse Deterrent Formulas

Abuse deterrent formulas (ADFs) are drug formulations designed to prevent consumers from tampering with the drug. Common forms of tampering with prescription opioids include crushing to inject, smoke, or snort the drug, rather than swallowing (as prescribed), in order to achieve a better 'high.' ADFs can be categorized in three ways: "the 'fortress approach,' in which the formulation maintains its extended-release characteristics despite attempts to crush or dissolve it;" "the 'neutralizing approach,' in which the formulation is relatively easy to alter, but tampering with the formulation results in the release of a neutralizing antagonist;" or "the 'aversive approach,' in which the opioid is formulated with an aversive agent that results in unpleasant side effects when a large quantity of the opioid is ingested" (Hahn). However, ADFs are typically only able to target one way of tampering rather than multiple. For example, a "neutralizing approach" that includes naloxone to counteract the effect of the opioid may only work if the drug is injected intravenously (Leece 718). Thus, including naloxone in prescription opioids will have no effect if the drug is chewed or snorted. Other examples of ADF drugs include slow release oxycodone (fortress approach), Suboxone (neutralizing approach), Embeda (neutralizing approach), Acurox (aversive approach) (Leece 717; Hahn).

> *"'After that [the reformulation of OxyContin], that pills either went dry or were just too expensive to get. And everybody who used to deal pills started dealing heroin instead.'" – Barbara Van Rooyan in Dopesick (Macy* 133*).*

Unfortunately, research does not find that ADFs reduce opioid related deaths. In fact, overall opioid-related death rates have risen since first abuse deterrent formulations were introduced, as those with OUD switch to other prescription opioids, heroin, or fentanyl to achieve a 'high' (Leece 717). For example, a study concluded that before OxyContin's

reformulation in 2010[17] there was no correlation between heroin mortality trends and opioid misuse, but after the reformulation, for every percent reduction OxyContin misuse due to its reformulation, there was an increase in heroin-related deaths of 3.1 per 100,000 persons (National Academies of Sciences, Engineering). ADFs are also more expensive than generic opioids and are less likely to be covered by private or public insurance (Leece 718). The switch to another form of opioids following ADFs presents the same ramifications that has been noted with other policy actions, like prescription limits; i.e. they generate ways to subvert the policy's intentions.

Tertiary Treatment

Good Samaritan Laws and Drug Courts

US drug policy teeters between punitive measures and rehabilitative processes. Recent policy avows that the "government should deter sales of illegal opioids through harsh punishments, while individuals who use opioids should not face criminal charges and, when possible, should be directed to treatment services rather than to prisons" (Parker 373). The expansion of Good Samaritan laws and drug courts coupled with harsher drug laws for traffickers reflect this sentiment.

Good Samaritan laws provide immunity to those who notify emergency naloxone services. Studies find that the fear of police and arrest is a primary reason why people do not call for help when they have witnessed an overdose (Parker 373). New Mexico was the first state to enact a Good Samaritan law in 2001, and 39 states have followed since. Unfortunately, a study of Good

[17] OxyContin's reformulation utilizes the "fortress approach:" the pill is coated with plastic polymer to prevent chewing, cutting, or crushing (Hahn).

Barbara Van Rooyan petitioned the FDA and testified before the US House of Representatives regarding opioid drug policy.

Samaritan laws found that although they were "associated with a small decrease in opioid-related deaths," the result was not statistically significant (Parker 373).

Drug courts include regular monitoring by the court in order to impose mandated abstinence treatment on a defendant arrested for drug possession (Parker 374). There are about 3,000 drug courts throughout the US (Macy 220). Today, some courts allow offenders to utilize Medicated Assisted Treatment (MAT)[18] as a means of treatment during the process (Parker 374). Should a defendant fail a drug test or commit another crime, they will face immediate punitive consequences (Macy 220). Defendants who successfully complete drug court programs are a half to a third less likely to recidivate, while the initial charge instigating the defendants' program participation is usually dropped (Macy 220). Relatedly, diversion programs "put [a] criminal charge on 'hold' while [a] defendant completes a specified treatment program" (Parker 374). Drug courts and diversion programs continue to be controversial (Parker 374). Research validates, however, that those who continue to endorse criminal penalties for drug use still endorse stigmatic labeling of people with substance use disorder (See Chapter III Part II) (Corrigan 46). Tension between these two sides has been present since the start of the war on drugs in the 1970s.

Substance Abuse Treatment: Rehabilitation and Medication Assisted Treatment

Substance abuse treatment is "treatment received for illicit drug or alcohol use or for medical problems associated with the use of illicit drugs or alcohol" (Hughes). Research finds that it takes the average opioid user eight years and four to five treatment attempts to achieve remission for just one year of opioid use (Macy 243). Treatment usually takes place at hospitals, rehabilitation facilities, mental health centers, emergency rooms, doctor's offices, prison or jail, or self-help groups, like Narcotic Anonymous (Hughes). Opioid treatment programs (OTPs), a subset

[18] Explained more fully in *Substance Abuse Treatment* section below.

of substance abuse treatment, were specifically created in response to the opioid crisis. OTPs utilize rehabilitation or medication assisted treatment (MAT) or a combination of the two, discussed below. Eighty-eight percent of OTPs are privately owned, and the remaining 12 percent are run by local, state, federal, or tribal governments; however, federal and state governments provide funding to more than half of all facilities, public and private, nationwide (Parker 371). As such, public policy has a major impact on the availability and funding of OTPs. Despite the current need for OTPs, SAMHSA has found that only 8 to 10 percent of substance abuse treatment facilities have OTPs (Alderks).

Rehabilitation is the use of therapy in an individual, group, or family setting to "help patients recognize the impact" of their substance abuse behaviors and teach and motivate patients to change behavior (U.S. Department of Health and Human Services 23). Peer support groups within rehabilitation settings are also used to address self and public shaming and stigma users may feel (Corrigan 47). As discussed below, most studies support counseling for substance abuse treatment to be paired with MAT (U.S. Department of Health and Human Services 23). Unfortunately, a "significant portion [of OTPs] do not use medication, but rather promote non-medication treatment models" exclusively (Parker 372).

MAT is the use of prescription medication to treat OUD. MAT refers to three specific medications: methadone, buprenorphine, and naltrexone. Methadone, which has been in use since 1964 as a pain reliever, also functions as an opioid agonist, meaning it can prevent withdrawal symptoms and also block the effects of opioid drugs (Alderks; "Methadone"). However, as noted in Chapter I, methadone has a high risk for addiction, so it should be used under proper care ("Methadone"). Buprenorphine, a partial opioid agonist, was introduced in 2002 to block the effects of opioids. Naltrexone, an opioid antagonist, approved in 2010, is an extended-release

injectable drug that is used to prevent relapse by reducing the urge to misuse opioids (Alderks). There are no "differences in efficacy" between methadone and buprenorphine maintenance therapies, but both are more effective than naltrexone (National Academies of Sciences, Engineering).

Critics believe MAT simply substitutes "one opioid for another" (Dyer); however, studies find that the long-term use of MAT is associated with decreased prescription opioid use, better "adherence to medication and psychological therapies for opioid dependence," and general improvements in quality of life (National Academies of Sciences, Engineering). MAT is now considered the pinnacle of OUD therapy; however, it is not a perfect solution. One study found that 50 percent of users relapsed within a month of being weaned off buprenorphine (Macy 222). Another found that only one-third of buprenorphine patients were drug-free after 18 months, another third were still on MAT, and the remaining majority were using heroin or illicit opioids again (Macy 222). As such, the length of buprenorphine treatment is patient dependent. Some patients may elect to stay on buprenorphine for the remainder of their life, which is a perfectly safe and healthy solution. Some experts believe that the use of medication alone is not sufficient to provide a full and long-term recovery. Instead, they contend medication should be coupled with therapy and support groups in order to provide a wholistic recovery that includes interpersonal and spiritual changes (National Academies of Sciences, Engineering). Despite this, patients that received individual counseling with MAT "showed no additional benefit" compared to those who received MAT only (National Academies of Sciences, Engineering). Regardless, MAT is essential, as "withholding medications greatly increases the risk of relapse to illicit opioid use and overdose death" (U.S. Department of Health and Human Services 23).

A key feature of MAT's success is a patient's ability to receive the necessary medications. Unfortunately, MAT is currently "stigmatized, poorly funded, and used less [in the US] than in many other developed countries" (Dyer). Alex Azar, health secretary at the FDA, "told a gathering of state governors that 'it will be near impossible to turn the tide on this epidemic' unless America turns to treatments" like MAT (Dyer). Only about a third of all US treatment centers provide MAT (Macy 239).

MAT availability is limited due to regulation and a lack of infrastructure for providing the medications. For example, methadone must be dispensed and taken in a federally-approved OTP[19] (Alderks). Buprenorphine may only be prescribed by health care professionals who meet statutory requirements for a waiver to provide the drug, as stipulated by the Controlled Substances Act, and abide by renewal and reporting requirements (U.S. Department of Health and Human Services 10). This discourages health care professionals participation because complying is time-consuming and burdensome. Furthermore, buprenorphine waivered physicians are only allowed to treat up to 275 patients (U.S. Department of Health and Human Services 11). Naltrexone can be prescribed by any licensed clinician, and there is no limit on the number of patients a prescriber can treat with naltrexone; however, as discussed above, naltrexone has been found to be less effective than buprenorphine or methadone (*An Introduction to Extended-Release Injectable Naltrexone* 2).

MAT requires repeated doctor visits, and in some cases, daily facility visits to receive medication, which may not be a viable option to those who live far from the few facilities that offer MAT (Alderks). Rural residents, who are particularly affected by the opioid crisis, face decreased access to MAT and face "greater transportation barriers" than non-rural residents (Dew 18). Further, rural substance use treatment services are typically half as available as in urban areas

[19] After periods of "stability" with the drug a patient may be allowed to have methadone home treatment visits ("Methadone").

(Dew 18). MAT is also hindered by limited insurance coverage. Prior to the Affordable Care Act, Medicaid programs were not required to provide coverage for OUD (National Academies of Sciences, Engineering). Under the Act, Medicaid programs must offer substance abuse treatment, but are not required to cover all three OUD medication options[20] (National Academies of Sciences, Engineering). It is important that Medicaid, which covers 30 percent of Americans with OUD, covers all three medications because patients may not respond well to one of the medications and each provides different benefits (National Academies of Sciences, Engineering).

Fortunately, MAT availability has increased the past few years as a result of state and federal action. The number of OTPs offering buprenorphine has increased from 11 percent in 2003 to 58 percent in 2015 (Alderks). Furthermore, in 2004, only 727 clients received buprenorphine treatment, but as of 2015, over 21,000 clients received buprenorphine treatment (Alderks). In 2011, 11 percent of OTPs and 8 percent of substance abuse treatment facilities without OTPs offered injectable naltrexone services, while in 2015, 23 percent of OTPs and 16 percent of substance abuse treatment facilities without OTPs offered naltrexone services (Alderks). After the passage of CARA, nurse practitioners and physician assistants are also allowed to prescribe naltrexone and buprenorphine, which should help increase access to the medications (U.S. Department of Health and Human Services 11). Only 21 percent to 25 percent of all OTP clients receive methadone; however, "a recent study found that offering Medicaid reimbursement for methadone significantly increases the portion of enrollees receiving treatment," suggesting many needing treatment do not find other treatment options (Alderks; National Academies of Sciences, Engineering). Though recent changes in regulation have increased MAT availability, additional policy adjustments and funding are needed for MAT to reach its full potential.

[20] As of 2016, all state Medicaid programs cover buprenorphine, 48 cover naltrexone, and only 34 cover methadone (National Academies of Sciences, Engineering).

MAT critics argue that quality of care varies across facilities, and when one pays "fifty thousand dollars for treatment" they should get the "gold standard of care" (Macy 238). While some argue for looser regulations surrounding MAT, others argue for increased regulation to prevent "cash-cow" clinics (Macy 238). Both patients and doctors looking to make money can use MAT inappropriately. According to rural MAT patients Macy interviewed, some doctors who do specialize in MAT overprescribe the drugs "fully knowing [patients] would sell some on the black market so they could afford to return for the next visit" (Macy 213). These behaviors suggest flaws in the system: physicians' lack of responsibility in prescribing and patients' inability to afford treatment due to the lack of insurance coverage.

The Overdose Reversal Drug: Naloxone

Naloxone is an opioid antagonist medication used to reverse an opioid overdose if used within 1 to 3 hours of overdose (U.S. Department of Health and Human Services 18). Although naloxone cannot prevent the initial use of opioids, it helps save lives. One study found that access to naloxone was associated with a 9 percent to 11 percent decrease in opioid-related deaths, without increasing the prevalence or frequency of opioid use (Parker 373; U.S. Department of Health and Human Services 18). Increasing naloxone access and education for administration has the "potential to help decrease opioid overdose related deaths" (U.S. Department of Health and Human Services 18).

Many states are enacting policies to increase naloxone access, naloxone training, and Good Samaritan laws to grant legal immunity to 911 callers. Previously, it was illegal to possess or administer naloxone without a prescription, but now 43 states have passed laws that authorize pharmacists to dispense naloxone without a prescription to those who are likely to encounter an overdose situation, and 46 states provide some sort or civil or criminal immunity for administering

naloxone (Freeman 29; Parker 372). Walgreens and CVS have also tried to offer naloxone over the counter, but research is inconclusive regarding how effectively this has been implemented (Parker 372).

The lack of education about proper use of naloxone and confusion regarding regulations relating to the medication can inhibit its usage. Fortunately, the number of organizations and local sites offering training and naloxone kits have increased dramatically since 2010, well over 100 percent (Parker 373). Other issues hampering naloxone use are its cost and complicated billing requirements (Freeman 32).

Syringe Service Programs

Syringe Service Programs (SSPs), or clean needle exchanges, provide a platform for users to obtain sterile needles to prevent the transmission of infectious diseases, such as HIV. SSPs were introduced in the 1980s in response to the AIDS epidemic, but have resurfaced as prescription opioid users have transitioned to intravenous prescription opioid use or heroin. SSPs have not been found to increase drug use (U.S. Department of Health and Human Services 18). SSPs are associated with a greater than 60 percent reduction in the risk of contracting hepatitis B or C (Phillips). The Surgeon General explains that SSPs are most effective when they offer other services, such as on-site health care professionals, HIV testing, overdose education and naloxone, and referrals to treatment options.

SSP availability varies state by state, depending on local regulation and available funding. Only 18 states explicitly authorize SSPs; however, SSPs currently exist in 41 states, although 50 percent of these are operated through private organizations (Phillips). Regardless of ownership configuration, many SSPs receive funds from local, state, and federal donations and grants (Phillips). In 2015, Congress expanded SSP funding by reversing the ban on using federal funds

for SSPs. The federal government provides funding for SSPs if the locality requiring the SSP provides evidence of an existing or significant risk of an infectious outbreak due to injection drug use ("Preventing HIV And Hepatitis Among People Who Inject Drugs And Their Partners"). Although some oppose the upfront investments associated with funding SSPs, because they believe it is a moral hazard that encourages drug use, preventing infectious diseases ultimately saves money spent on much more expensive infectious disease treatments. A study by Marshall University researchers on SSPs in West Virginia finds that for every dollar invested in SSPs, six dollars are saved in costs associated with HIV (Phillips). Further, the cost of preventing HIV using SSPs ranges from $4,000 to $12,000, while HIV treatment costs up to $190,000 (Phillips).

Residents located near SSPs also worry about the improper disposing of needles, which can lead to environmental and health hazards. Syringe service programs, however, typically operate on the needle exchange model, in which a clean needle is only dispensed when a dirty needle is turned in. This reduces the number of improperly disposed needles, as syringe service facilities are responsible for disposing of dirty needles rather than users. Nevertheless, a needle prick from an improperly discarded needle can mean "weeks of taking drugs to prevent the spread of infection, with side effects including nausea, depression, and extreme fatigue as well as months waiting for expensive periodic tests to reveal whether contracted HIV/AIDs or hepatitis B or C" (Phillips).

Part II: Barriers to Policy Success

Historically, substance use was viewed as a social or criminal problem and not considered a responsibility of health care systems, so treatment and prevention were not integrated with the general or mental health care and were less likely to be covered by insurance. Despite recent policy changes, a treatment gap for substance use disorders still exists: 80 percent of those with OUD did

not receive treatment between 2009 and 2013, and, in 2019, only about 28.6 percent of people with OUD received the treatment they needed (Meinhofer 177-178; U.S. Department of Health and Human Services 7). However, only 39.7 percent of those with some form of substance use dependency are ready to stop using, so policy must also be designed to encourage people to get treatment and motivate people to quit (U.S. Department of Health and Human Services 23). Regardless, policy responses struggle to reach their full potential due to a multitude of barriers, including a lack of proper funding and stigma.

Regarding funding, several of the aforementioned policies require minimal funding because they simply rely on changes in legislation and regulation, rather than development of new systems. Examples of these policies include prescription limits, Good Samaritan laws, and stricter trafficking laws (Parker 376). Other policies have much higher costs, such as PDMPs, which are estimated to cost an average of $1 million to launch and $500,000 annually to operate (Parker 376). However, even this upfront cost is ultimately less than the cost of treating OUD. As Macy argues, it is easier and more affordable to fix the problem upstream rather than when someone is in the "ER with stage-four cancer…and they need extended hospital stays…It's a drain on the system no matter what, so why can't we fix it upstream?" (Macy 278). Fortunately, several federal recent regulations have created grants to distribute to states in need of funding for opioid policy implementation.

In terms of stigma, SAMHSA prioritizes stigma as an "essential barrier" to the public health agenda for opioid use disorder (Corrigan 44). Stigma is socially constructed, and is defined as "an attitude, behavior, or condition that is socially discrediting" (*Opioid Response Plan for the State of West*

Stigma "undermines the internal motivation for change" (Opioid Response Plan for the State of West Virginia 10-11*).*

Virginia 10). Not only does public stigma against drug users prevent public treatment facilities, SSPs, drug courts and the like from being established, stigma also discourages people to who need help from participating in these programs because they feel "shame" and "guilt" (Corrigan 45). Research shows that healthcare providers also fall privy to stigma and may withhold care and pharmacy services to people with substance use disorder (Corrigan 45). Finally, Dew finds that those in rural areas are more likely to identify stigma as an "impediment" in seeking treatment (Dew 18).

In 2017, the White House Commission on Combating Drug Addiction and the Opioid Crisis advanced the need for a reducing stigma surrounding opioid use through public education (Corrigan 44). Unfortunately, most existing studies find that education about substance abuse as a medical condition does not lead to a significant decrease in stigma (Corrigan 47). Corrigan finds that coupling "contact" with education programs seems promising. Contact refers to the general population interacting with people in recovery for substance use disorder (Corrigan 47). Incorporating contact programs can be complex, as those in recovery must be willing to disclose and discuss their condition. Further, too intimate of contact relationships, for example, relationships among family members, can "actually lead to anger and stigma" (Corrigan 47). There is no proven way to reduce public stigma against substance use disorders. Hopefully gradual changes in public sentiment will encourage increased user participation in OTPs, while also leading to expanded access and funding for opioid prevention and treatment programs.

Part III: Individual State Policy Analysis

The following section describes opioid policy initiatives undertaken by the five states with the highest rates of opioid overdose as identified in Chapter II. As a thesis could be written on each of these state's policies individually, this section provides an overview and summary of key

initiatives. This section is designed to highlight trends in policy as a basis for comparison across these states.

West Virginia

West Virginia has been experiencing a self-described "public health epidemic of drug overdose deaths for more than a decade" (Haddy 4). This peaked in 2011, when West Virginia had the nation's highest age-adjusted opioid drug overdose mortality rate in the nation (36.3 overdose deaths per 100,000 persons), more than twice as high as the US average (13.2 overdose deaths per 100,000 persons) and over a third higher than the next highest state, Kentucky (Haddy 4). Chapter II set out the factors that likely lead or contributed to West Virginia's circumstance. In 2013, West Virginia implemented measures to address the issue, including a state PDMP to track prescriptions for individual patients (Bailey). Nevertheless, in 2016, West Virginia still had the highest rate of opioid overdose death rate of all the states (43.4 opioid overdose deaths per 100,000 persons), surpassing the next closest state, Ohio, by over 20 percent (32.9 opioid overdose deaths per 100,000) ("Opioid Summaries by State"). Prior to 2012, West Virginia's drug overdose deaths were predominately due to prescription drugs, such as oxycodone, being used for nonmedical purposes (Haddy 4; *Opioid Response Plan for the State of West Virginia* 4). Since 2013, however, the trend has shifted to injected heroin and synthetic opioids, such as fentanyl (Haddy 4; *Opioid Response Plan for the State of West Virginia* 4). In attempts to once again address this epidemic, West Virginia enacted a new series of policy initiatives in 2018 (Gupta, "Legislation"). Although it is too soon to determine whether these recent initiatives have been successful, this section discusses them in conjunction with the prior initiatives to shed light on what did not work in the first instance and what may have contributed to a change in the type of opioid misused as opposed to a reduction in opioid overdose deaths.

In 2018, West Virginia passed Senate Bill 272 to create the West Virginia Office of Drug Control Policy, enabling the West Virginia State Health Officer to treat and manage substance use disorder as a public health problem rather than a criminal justice issue (Gupta, "Legislation"). The West Virginia Department of Health and Human Resources created an Opioid Response Plan to outline needed actions. Table 1 below summarizes the plan's top priorities and most salient recommendations. The following paragraphs will expand on some of these initiatives and compare them to 2013 initiatives where applicable.

Table 1: West Virginia Opioid Response Plan

Category	**Description of Policy Initiative**
Primary Prevention	A. Prevent inappropriate prescribing of pain medication B. Educate the public about OUD as a disease to reduce stigma
Secondary Screening and Intervention	A. Improve treatment options by removing legal barriers and adding resources B. Limit duration of opioid prescriptions
Tertiary Treatment	A. Expand treatment options for OUD and remove regulatory barriers B. Expand treatment for OUD in hospital emergency departments and the criminal justice system C. Expand naloxone access and training through community-based programs and insurance coverage D. Expand peer-based support programs
Support for Families with Substance Use Disorder	A. Expand programs to serve families through home visits and NAS treatment B. Expand access to contraceptive services for those with substance use disorder

In 2013, West Virginia implemented a state PDMP, known as RxDataTrack CSAPP (Controlled Substance Automated Prescription Program), to track prescriptions for individual

patients (Bailey). It required those dispensing prescriptions directly to patients, such as pharmacists or physicians, to reference the PDMP when dispensing Schedule II, III, or IV substances (Bailey). Practitioners were also required to register with the PDMP and maintain appropriate access, but they were only encouraged, not required, to reference the system when prescribing (Uniform Controlled Substances Act. W. Va.). As of February 2016, West Virginia's PDMP was connected with 10 other state PDMPs to facilitate cross-referencing any prescriptions that may have been obtained out of state. Despite the PDMP, West Virginia continued to lead the nation in opioid deaths as described above. In 2017, West Virginia studied trends in these deaths and discovered that 91 percent of all decedents had a documented history in the PDMP and were three times more likely to have three or more prescribers as compared to the overall population in the PDMP (*Opioid Response Plan for the State of West Virginia* 5). Further, decedents were more than 70 times likely to have prescriptions at four or more pharmacies compared to the overall population in the PDMP (*Opioid Response Plan for the State of West Virginia* 5). In addition, 33 percent of the decedents had no record of a prescription at their time of death, indicating diversion of a controlled substance prescription (*Opioid Response Plan for the State of West Virginia* 5).

Thus, in 2018, West Virginia passed Senate Bill 273 to further reduce opioid prescribing. The bill requires prescribers to check the controlled substances monitoring program database before prescribing. It limits opioid prescriptions to seven days and the lowest effective dose for adults seeking pain treatment through a primary care physician, four days for emergency room visits, and three days for dentists and optometrists (Senate Bill 273). The bill also requires prescribers to follow up with the patient in a matter of days and refer the patient to a chronic pain clinic should the patient reach three or more opioid prescriptions (Senate Bill 273). The restrictions aim to prevent pills from entering the illegal drug market and people from developing addictions.

West Virginia's new initiatives also seek to improve tertiary treatment. For example, West Virginia is increasing access to MAT through the Comprehensive Opioid Addiction Treatment (COAT) model (*Opioid Response Plan for the State of West Virginia* 16). Through COAT, patients are connected with a dedicated case manager and receive psychotherapy and educational groups along with appropriate medication. Previously, MAT in West Virginia was hindered by "burdensome regulations," such as limiting methadone and buprenorphine prescribing (*Opioid Response Plan for the State of West Virginia* 16). In November 2018, West Virginia made legislative changes to ease MAT requirements, including allowing physicians to treat 30 or fewer patients using MAT without registering through the state, saving smaller programs time and money (C. Johnson; Jarvis). This also increases opportunities for those living in rural areas to get access to treatment, which can be scarce in these areas (Gupta). Further, the state will reimburse providers who "do a warm handoff[21] to other agencies" that are able to provide mentorship and therapy for patients receiving MAT (Gupta).

In conjunction, West Virginia enacted legislation focused on educating the public about overdoses and to thwart overdose deaths. Senate Bill 272 created the Community Overdose Response Demonstration Pilot Project, which teaches community members how to identify an overdose and properly respond (Senate Bill 272). It also requires first responders to carry naloxone. Similarly, Senate Bill 335 allows health care providers to provide naloxone to individuals who know someone who may experience an opioid overdose and establishes liability protection for those who dispense or administer naloxone (Senate Bill 272, Senate Bill 335). Further, to decrease stigma, West Virginia is advancing a campaign to encourage people to "seek help, instead of enduring shame" (*Opioid Response Plan for the State of West Virginia* 12). Although West

[21] Warm handoff refers to a health care provider connecting a patient to a drug treatment provider in a face-to-face meeting.

Virginia has made improvements regarding MAT and naloxone access, it still prohibits Medicaid coverage of methadone and requires insurance preauthorization, which prevents low threshold access among privately insured patients (Dasgupta 184).

West Virginia also introduced syringe service programs in 2013, but they are still not widely utilized. The West Virginia Department of Health and Human Resources partnered with local governments to provide these services through clinics and recovery centers ("State Laws"). West Virginia state law "neither prohibited nor expressly permitted" SSPs, but state law does prohibit using funds for SSPs (Bixler 530; Hopkins). As of August 2017, the CDC reports that there were only nine SSPs in West Virginia, which may be due to the lack of funding and opposing views of SSPs (Bixler 530). As an example, an SSP in Charleston, West Virginia shut down in March 2018 after opponents argued the SSP was an "unregulated, mismanaged nightmare and "'a mini-mall for junkies and drug dealers'" (Katz). Proponents argued that the SSP was a "crucial response to an escalating crisis, and the last bulwark standing between…a potential outbreak of hepatitis and HIV" (Katz). Charleston's SSP also offered services like on-site medical care, disease screening, counseling, and connections to drug treatment (Katz). Josh Katz of the New York Times claims that the SSP's success might have been its downfall, as the program could not adequately control and sustain the number of patrons, and law enforcement received complaints about improperly discarded needles. Although closing the SSP was accompanied with genuine concern, desperate users turned to stealing, robbing, and sharing to obtain needles leading to crime and HIV outbreaks (Katz). Charleston's attempt at an SSP illustrates the dilemma other areas affected by this crisis face.

Ohio

To address its opioid crisis, Ohio established the Governor's Cabinet Opiate Action Team (GCOAT) to achieve three goals: (1) promote the responsible use of opioids; (2) reduce the supply of opioids; and (3) support overdose prevention (Penm, "Strategies" 2). To prevent drug use before it starts, Ohio has implemented primary prevention policies, such as increased drug trafficking efforts and programs to prevent youth drug use. In 2011, Ohio Governor John Kasich signed legislation to "shut down 'pill mill' pain clinics in Ohio (*Combating the Opiate Crisis in Ohio* 1). In 2018, Ohio implemented regulations to monitor pharmaceutical wholesalers for suspicious practices (*New Strategies to Combat the Opiate Crisis in Ohio* 1; Penm, "Strategies" 1). Between 2011 and 2014, the State Medical Board of Ohio and the Ohio Board of Pharmacy revoked the licenses of 61 doctors and 15 pharmacists for violations involving improper prescribing or dispensing of prescription drugs (Penm, "Strategies" 3). Ohio has also made efforts to educate the population regarding drug use, such as the *Start Talking!* program to discourage drug use among youths (*Combating the Opiate Crisis in Ohio* 3).

In terms of secondary screening and intervention, Ohio introduced its PDMP, the Ohio Automated RX Reporting System (OARRS), in 2011. In 2014, Ohio House Bill 341 mandated use of the system (Penm, "Strategies" 3). As of 2016, Ohio "led the nation in prescription drug monitoring," i.e. from 2011 to 2016, the number of PDMP queries in Ohio increased from 1.8 million to 24.1 million (*Prescription Opioid Overdose Deaths Down* 2). Additionally, Ohio provides a good example of the impact mandating PDMP use can make. Ohio PDMP queries rose by 505 percent after PDMP utilization was designated as mandatory (Grecu). Ohio also started providing prescription drug drop boxes to law enforcement agencies and pharmacies (*New Strategies to Combat the Opiate Crisis in Ohio* 3).

Each of these primary prevention and secondary screening policies have led to a decrease in the supply of available prescription opioids; however, fentanyl overdoses have increased since these policies were implemented, which is reflected in the fact that Ohio's 2016 opioid overdose rate remains well above the national average (*Prescription Opioid Overdose Deaths Down* 4*;* "Heroin And Opioid Epidemic In Ohio"). Although this could be coincidental, it may point to the association between restricted prescription opioid supply and increased heroin and fentanyl use, as research suggests. In response, Ohio has increased penalties for trafficking fentanyl ("Heroin And Opioid Epidemic In Ohio").

In addition to primary and secondary initiatives, Ohio has also increased treatment options, access to naloxone, and enacted laws to protect Good Samaritans. Between 2011 and 2016, Ohio authorized expanded use of MAT drugs, decreased administrative authorizations required for MAT administration, expanded Medicaid coverage for MAT services, and expanded MAT availability for those incarcerated (*Combating the Opiate Crisis in Ohio* 10). Ohio has also been working to establish more treatment centers, such as the new Southern Ohio Addiction Treatment Center, to address "gap[s] in local services" for those with OUD (*Combating the Opiate Crisis in Ohio* 9).

Ohio is also increasing naloxone awareness and availability. In 2014, Ohio authorized first responders to administer naloxone and authorized family and friends to obtain naloxone prescriptions for those at risk of an opioid overdose (*Combating the Opiate Crisis in Ohio* 7). As of 2015, Ohio pharmacists can distribute naloxone without a prescription, and in 2016, Ohio initiated a campaign to educate and encourage the public about naloxone use (*Combating the Opiate Crisis in Ohio* 8). Though Ohio's Appalachian and rural regions have, on average, the highest rates of opioid overdose, naloxone administration was lowest in these areas of the state

(Massatti 12). This suggests that these areas have less access to treatment and overdose medications than more populous regions of the state. Finally, Ohio has enacted Good Samaritan laws to provide immunity to those who notify emergency authorities of an overdose (*Combating the Opiate Crisis in Ohio* 8).

Ohio's plan to combat the opioid crisis includes reallocating funding and utilizing federal grants. In 2016, Ohio was awarded an $8.2 million federal grant to improve community and prescriber opioid education, increase the use of the state's PDMP, and connect people at risk of an overdose with treatment resources (*Combating the Opiate Crisis in Ohio* 5). In 2018, the Ohio Department of Mental Health and Addiction Services received $110 million in federal funding to expand prevention efforts and treatment (*New Strategies to Combat the Opiate Crisis in Ohio* 3). These are just two of the many examples of funding Ohio has allocated or obtained to combat its opioid crisis.

Through its opioid initiatives, Ohio has made "significant progress" in reducing the number of prescription opioids in circulation ("Annual Drug Overdose Report"). Opioid overdose deaths not involving fentanyl[22] declined 28 percent from 2011 to 2017 (*Prescription Opioid Overdose Deaths Down* 1). Ohio has also seen an 88 percent decrease in doctor shopping (2012-2017), as the use of Ohio's PDMP has gone up 4,900 percent (*Prescription Opioid Overdose Deaths Down* 1). Despite its progress, Ohio's full opioid recovery is still plagued by the rise in fentanyl availability and limited access to MAT and naloxone, especially in rural areas, due to costs and stigma.

[22] Ohio overdoses involving fentanyl have increased. In 2014, only 19.9 percent of overdoses involved illicit opioids (like fentanyl), compared to 70.7 percent in 2017 (*Prescription Opioid Overdose Deaths Down* 4).

New Hampshire

As discussed in Chapter II, New Hampshire had the third highest rate of opioid overdose deaths in 2016 (35.8 deaths per 100,000) ("Opioid Summaries by State"). However, from 1999 to 2013, opioid overdose rates in New Hampshire were comparable to the national average ("Opioid Summaries by State"). The state's skyrocketing opioid problem appears to coincide with the enactment of laws that restrict the supply of prescription opioids, discussed below. New Hampshire is an interesting example of how inappropriate policy, like restricting prescription opioid supply, can have negative spillover effects.

Beginning in 2012, New Hampshire required prescribers to utilize the state's PDMP (*New Hampshire PDMP*). New Hampshire also implemented a series of opioid prescription limits. Prescription limits vary depending on a patient's specific circumstance and pain situation, but overall, the legislation advises for the lowest effective dose and for a limited duration, and requires drug testing and continual patient evaluation for high dose and long-term prescriptions (New Hampshire State, General Court). As a result, opioid prescription rates have decreased. However, as explained previously, those with OUD may turn to illicit opioids when their source of prescription opioids is restricted and they cannot find substance use treatment. This is reflected in reports that in 2017, 75 percent of all overdose deaths in New Hampshire involved fentanyl (*New Hampshire Governor's Commission on Alcohol and Drug Abuse Prevention*). To make matters worse, fentanyl availability in the state continues to increase. From 2014 to 2017, there was an increase of 2,110 drug seizure cases involving fentanyl-class drugs; which represents the most substantial increase of drug seizure cases in the state (*New Hampshire Governor's Commission on Alcohol and Drug Abuse Prevention*).

In August 2014, New Hampshire expanded Medicaid coverage for low-income adults to include coverage for substance use treatment (*New Hampshire Governor's Commission on Alcohol and Drug Abuse Prevention*). New Hampshire also afforded additional funding to expand substance use treatment for the Medicaid population in 2016 (*New Hampshire Governor's Commission on Alcohol and Drug Abuse Prevention*). Nevertheless, New Hampshire ranks near the bottom in treatment program availability among states (Seelye). For example, on average, Northeastern states have 15.5 doctors per 100,000 residents who can prescribe MAT drugs, while New Hampshire only has, on average, seven doctors per 100,000 residents who can prescribe MAT drugs (Seelye). This shortage in addiction and recovery personnel contributes to the lack of substance abuse treatment options available in the state. Realizing the need for treatment facilities, New Hampshire has applied for federal grants of up to $45.8 million to fund its proposal to establish nine OUD treatment facilities (Ramer). In response to limited treatment facilities, local governments are also taking action. For example, the Manchester Fire Department of New Hampshire started a treatment program called Safe Station which provides 24-hour access for addiction treatment (Seelye). At the stations, clients are also referred to a behavioral health treatment agency connected with the fire department's central station (Seelye).

In 2016, New Hampshire's Bureau of Drug and Alcohol Services Substance Misuse Prevention outlined initiatives to provide community opioid education and youth opioid monitoring (*Substance Misuse Prevention Coordinator's Manual* 6-8). However, as of 2017, New Hampshire had the "second lowest rate of spending on substance use treatment and prevention" (Leins). In response, New Hampshire's 2018 opioid treatment proposal calls for an investment in higher education to expand the substance use treatment workforce (Ramer). New Hampshire has implemented SSPs and expanded treatment facilities and naloxone access. New Hampshire

legalized SSPs in June 2017. SSP legislation in New Hampshire does not provide funding for SSPs, but it does require SSPs to register with the state, offer screening for infectious diseases, and provide clients with referrals for treatment options ("Sununu Signs Bill Allowing Needle Exchange Programs"). New Hampshire's first SSP, opened by Dartmouth medical students in summer 2018, was shut down this past October due to its proximity to a school (Seelye). Although important to consider safe and appropriate locations for such facilities, shutting down this SSP demonstrates the controversies about SSPs and the 'not in my backyard' mentality. This situation resembles the shutdown of Charleston's SSP in West Virginia, discussed above.

Finally, to prevent overdose deaths, New Hampshire legalized naloxone administration by pharmacists, doctors, and the general public to someone in need, and implemented Good Samaritan laws to provide immunity to those who call emergency responders in the event of an overdose (2015) (House Bill 271). However, according to Bob Stout of the New Hampshire Board of Pharmacy, the lack of education for proper naloxone administration and dispensing will slow the drug's usage (Sutherland).

Pennsylvania

Pennsylvania, which had the fourth highest opioid overdose rate in 2016 has taken an "all hands-on deck approach" to prevent OUD and help those suffering from OUD ("Opioid Epidemic"). In January 2018, the governor signed a state disaster declaration granting the governor the ability to waive statutory regulations that create barriers to quickly and effectively executing policy and action ("Governor Wolf Declares Heroin and Opioid Epidemic a Statewide Disaster Emergency"). As a primary prevention measure, Pennsylvania has established prescribing guidelines and continuing education for health care providers regarding substance use disorder ("Opioid Epidemic").

Regarding secondary screening and intervention, Pennsylvania established drug take back boxes and a state PDMP. There are 580 drug take back boxes located across the state, and as of September 2018, over 445,000 pounds of prescription drugs have been deposited in them (Early). In 2017, Pennsylvania required providers to utilize the PDMP called Achieving Better Care by Monitoring All Prescriptions Program, (ABC-MAP), which was developed in 2016 (*Opioids and Prescription Drug Monitoring Program* 1). Since the PDMP's implementation, opioid dispensing has decreased by 16 percent and doctor shopping has declined (Early). The number of patients who went to 5+ prescribers and 5+ pharmacies in 3 months for Schedule II drugs decreased 89 percent, and the number who went to 10+ prescribers and 10+ pharmacies in 3 months for Schedule II drugs decreased 100 percent (Early).

In terms of tertiary treatment, Pennsylvania has increased access to MAT and naloxone, implemented Good Samaritan laws, and established drug courts. Pennsylvania launched 45 new MAT facilities in 2015 (*Spotlight on Pennsylvania* 1). The facilities provide certified recovery peer specialists in addition to MAT for a wholistic approach to recovery (*Spotlight on Pennsylvania* 9). Further, to streamline applying for MAT to increase its availability, Pennsylvania has waived regulatory provisions and licensing requirements for hospitals and emergency departments and high-performing drug and alcohol treatment facilities, while also allowing physicians to administer short-term MAT ("Governor Wolf Declares Heroin and Opioid Epidemic a Statewide Disaster Emergency"). Finally, Pennsylvania has also established a "warm handoff" approach for primary care providers to connect patients with substance abuse treatment ("Opioid Epidemic").

Pennsylvania's Secretary of Health issued Standing Order Act 139 to enable any member of the public to obtain and administer naloxone without the risk of being charged with a drug

offense (*Standing Order: Naloxone Prescription for Overdose Prevention* 2). Pennsylvanian pharmacists are also permitted to dispense naloxone a without prescription, and EMTs follow a naloxone leave behind protocol after attending to an overdose emergency ("Governor Wolf Declares Heroin and Opioid Epidemic a Statewide Disaster Emergency"). Finally, pharmacists are encouraged to partner with prisons and treatment programs to make naloxone available at these facilities ("Governor Wolf Declares Heroin and Opioid Epidemic a Statewide Disaster Emergency").

Pennsylvania also finds drug courts to be promising for those with drug-related charges. Pennsylvania treatment court data demonstrates that 78 percent of participants successfully complete drug court programs (2016), and the recidivism rate for drug-related charges is low (*The Mayor's Task Force to Combat The Opioid Epidemic in Philadelphia* 12). Data suggest that treatment courts reduce participants' re-arrest and re-conviction rates by approximately 6 percent to 26 percent (*The Mayor's Task Force to Combat The Opioid Epidemic in Philadelphia* 12). However, Pennsylvania treatment courts cannot currently serve all who qualify due to limited resources (*The Mayor's Task Force to Combat The Opioid Epidemic in Philadelphia* 12).

To fund all of these initiatives, Pennsylvania has received several SAMHSA funding grants. The State Targeted Response to the Opioid Crisis grants Pennsylvania $26.5 million a year for two years and the State Opioid Response Grant provides $55.9 million a year for two years to help curb the crisis (Early). In recognition of the numerous steps Pennsylvania has taken to combat the crisis, a report by The American Medical Association, Manatt Health, and The Pennsylvania Medical Society, credits the state for providing comprehensive support for MAT, providing medical oversight for Medicaid patients going through opioid therapy for pain management, and increasing naloxone access. However, the report also noted that Pennsylvania would be more

successful if it increased state treatment facility infrastructure and OUD treatment workforce, improved access to non-opioid pain treatment options, and offered more naloxone education (*Spotlight on Pennsylvania* 2). Pennsylvania state law requires counties operate at least two treatment centers for Medicaid patients within a 30-minute one-way drive for urban areas and within a 60-minute one-way drive in rural areas. This law may contribute to the limited treatment access for rural residents ("Pennsylvania's Opioid Epidemic").

A little more than half of SUD treatment facilities offer one type of MAT[23], and only 20 facilities offer all three types (*Spotlight on Pennsylvania* 12). The same report also cited stigma as a major barrier to success. Hopefully, with the additional funding described above will enable Pennsylvania will be able to improve its response to the opioid crisis.

Kentucky

Since 2003, Kentucky's opioid overdose death rate has exceeded the national average ("Opioid Summaries by State"). In 2012, Kentucky passed House Bill 1, requiring providers to attend continuing education for pain management and addiction disorders (Faryar 806). House Bill 1 also created a state PDMP called Kentucky All Schedule Prescription Electronic Reporting (KASPER) to regulate prescribing and dispensing standards for controlled substances (Faryar 806). Prescribers must register with and utilize the KASPER system. A 2015 study found that since its introduction, KASPER registration has increased 262 percent and annual prescriber queries rose 650 percent (Ceniceros). Though prescription opioid misuse declined in Kentucky, heroin use increased significantly. This parallels the rise in illegal drug use discussed in the previous states. As of 2016, Kentucky's opioid overdose rate still exceeded the national average (23.6 deaths per

[23] Type refers to the type of medication used.

100,000 persons vs 13.3 deaths per 100,000 persons) ("Opioid Summaries by State"). As such, Kentucky is continuing to take action.

In 2017, Kentucky approved House Bill 333 which limits opioid prescriptions to three days (*Overdose Fatality Report* 1). Further, legislation that would levy a 25-cent tax per dose on opioid distributors has been proposed. Should it be approved, prescription opioids will become more expensive, theoretically further reducing prescribing and use. Other states have proposed similar taxes with the intention of using the revenues to establish more treatment plan options (Sigo). According to Kentucky's policy, the revenue will be used for pension obligations and the 2019-2020 state budget, with no mention of using the taxes to help combat the opioid crisis (Sigo). Since the tax legislation has yet to be enacted, there is no data to determine if the tax will lead to increased heroin and fentanyl use; however, based on previous findings, it is likely.

In response to increased heroin and fentanyl availability and use, Kentucky enacted Senate Bill 192 in 2015 known as the "Heroin Bill" to increase criminal penalties for heroin and fentanyl trafficking (Dhanda 564). Two years later, in 2017, Kentucky passed House Bill 333 to further increase criminal penalties for heroin and fentanyl trafficking (*Overdose Fatality Report* 1). Senate Bill 192 also legalized SSPs, which permits pharmacists to dispense naloxone without prescriptions, provides protections for licensed health care providers who prescribe and dispense naloxone, and expanded existing Good Samaritan laws to protect individuals who carry naloxone to administer in cases of overdose (Dhanda 561).

A recurring theme in this review is that many policies have not reached their full potential. For example, SSPs, although now legal in Kentucky, require municipal government officials' authorization before they can be established in the respective areas (Q. Johnson 384). As a result, SSPs were slow to be established. For example, Boone County sought to establish an SSP;

however, a majority of the county court was not in support (Q. Johnson 384). Judge Gary Moore of Boone County calls the failure to establish an SSP the county's biggest failure in addressing the crisis (Q. Johnson 384). Similar situations also occurred in Kenton and Campbell counties (Q. Johnson 384). Judges from these counties attribute the failure to establish SSPs to the lack of public education about the opioid crisis, stigma related to drug use, and the 'not in my backyard' mentality (Q. Johnson 384). Despite a slow start, as of August 2017, among the 54 counties vulnerable to HIV outbreaks, 39 percent had operational or approved SSPs, serving over 8,000 clients (Bixler 529).

Furthermore, access to naloxone, especially in rural areas, depends on the willingness of community pharmacists to distribute the drug (Freeman 29). Pharmacists' willingness depends on the strength of the legal protections covering pharmacists, pharmacists' knowledge of naloxone legislation, pharmacists' view of their role in addressing the opioid crisis, and pharmacists' willingness to comply with necessary protocols should they choose to dispense naloxone. One study found that 54 percent of pharmacists in Kentucky are willing to dispense naloxone to someone with a valid prescription (which has always been legal) and 50 percent are willing to attend education on opioid overdose prevention, but only 24 percent indicated plans to follow regulatory procedures to become eligible to dispense naloxone to those without prescriptions (Freeman 31). Furthermore, the study found that pharmacists in rural areas were more concerned about the time required to develop and implement naloxone access programs, billing complications associated with naloxone, and knowledge of naloxone related laws compared to pharmacists in other practice settings (Freeman 32). Thus, pharmacist training and other logistical supports are needed to improve pharmacist confidence in dispensing, especially in rural areas where naloxone is often needed most.

As of 2014, Kentucky had only about one-tenth of the beds it needed for OUD treatment (Kemp). Furthermore, Kentucky, like West Virginia, prohibits Medicaid coverage of methadone, a drug critical for MAT (Dasgupta 184). In 2014, Kentucky received nearly $18 million to use for improving substance abuse treatment in the state (Kemp). Examples of applying this $18 million include allocating funding to 19 adolescent substance use treatment programs, and allocating $3 million towards substance use treatment for opioid-dependent pregnant and postpartum women (Kemp; Sebastian). In April 2018, Kentucky passed House Bill 124 to review substance use disorder recovery and treatment services and programs (House Bill 124). The review will provide information regarding the impact of Kentucky's efforts to stem the opioid crisis.

Meanwhile, due to the lack of available state-wide treatment, counties have taken action. According to Judge Pendery of Campbell County, over half of those incarcerated in Northern Kentucky jails have a substance use disorder (See Chapter II Part II). In response, Campbell and Kenton Counties, are implementing MAT coupled with counseling services in jails. After completing the program, inmates are connected with sober-living houses, additional MAT, and drug and alcohol abuse prevention programs (Q. Johnson 384). Kenton County's jail-based program has "garnered national attention" after it was "hailed…as a success and a model for future jail-based treatment in *The New York Times"* (Q. Johnson 384). Between 2015 and 2016, Kenton County had the largest decrease in opioid overdoses compared to other Kentucky counties (*Overdose Fatality Report* 2). Perhaps this is a coincidence, but it could also speak to the success of Kenton's local opioid policies. Both Kenton and Campbell Counties are continuing to expand treatment options, but limited funding, a lack of doctors allowed to prescribe buprenorphine, and county officials' inability to control MAT regulation hinder further development (Q. Johnson 385).

Part IV: Chapter Conclusion

In response to the opioid crisis, legislators across the country have enacted a series of policies aimed at improving primary, secondary, and tertiary prevention services. Although enacted with good intentions, some of these policies, such as prescription limits, PDMPs, and ADFs backfired, causing the prescription opioid crisis to balloon into a heroin and fentanyl crisis, accompanied with outbreaks of infectious disease and increased crime. For example, New Hampshire's opioid overdose rate, which was comparable with the national average, increased dramatically after ADFs, PDMPs, and prescription limits were introduced. As a result, policy must address, and federal and state resources must be allocated, to focus on decreasing fentanyl and heroin supplies. Policies that restrict prescription opioid availability through drug monitoring, prescription limits, abuse deterrents, and prescriber education and community awareness should help prevent future dependency, but do not address the treatment needs of those with OUD. Thus, these policies must be accompanied by increased OUD treatment availability to prevent those with OUD from switching to illicit opioids. Although access to OUD treatment options has improved over the past few years, treatment remains expensive and availability continues to be limited, especially in rural areas.

Chapter IV: Regression Analysis

To supplement the descriptive analysis provided in this thesis, correlational and cross-sectional statistical analyses were run to examine relationships between rates of opioid overdose deaths and characteristics of the 50 states and Washington DC, including state policies regarding controlled substances. The correlation matrixes and multiple linear stepwise regression were conducted in STATA version 15. Independent variables used in this analysis reflect a majority of the "potential contributing factors" discussed in Chapter II. One set of these variables were state

background characteristics: percent of state population below poverty line, percent of those residing in non-metro areas, percent of population that identifies as white race, unemployment rate, percent of the population that identifies as Democrat, and opioid prescriptions per 100 persons. The second set of these variables was state "policy responses" to controlled substances as discussed in Chapter III: facilities in the state offering MAT per 100,000 persons, whether or not the state has Good Samaritan Laws*[24], whether or not the state has syringe exchange programs*, whether or not the state mandates use of the PDMP*, whether or not the state has opioid prescription laws*, the level of naloxone access[25], and substance abuse spending per capita. The dependent variable was the opioid overdose death rate per 100,000 persons per state. Appendix 1 contains a table with each variable and its corresponding values by state.

Before discussing the results, the limitations of these analyses should be noted. First, because the analyses are cross-sectional, causal effects cannot be assumed. Furthermore, a longitudinal analysis is needed to determine any effects from policy changes over time rather than the analysis presented here in which variables are presented for only one point (i.e., one year) in time. Second, the year for which each variable was available is not consistent, which may also confound results. In addition, although the data come from credible sources, they were collected by different entities. Nevertheless, given differences in state background characteristics, state policy responses to controlled substances, and in particular, to the opioid crises, an exploratory analysis of these variables was of interest.

Correlations across all 50 states were assessed between each independent variable and the opioid overdose death rate. Using a p-value of .05, none of the background variables were

[24] The policy variables denoted with an "*" received a "1" if they had the policy and a "0" if they did not.
[25] States with no expanded naloxone access received a "0;" states with a standing order for naloxone dispensing received a "1;" states with a statewide standing order or naloxone access protocol received a "2;" states allowing naloxone dispensing without a prescription received a "3."

significantly related to the opioid overdose death rates. In terms of policy variables, this analysis found that MAT was significant with a p-value of .0001; syringe exchange programs were significant with a p-value of .0122; prescription limits were significant with a p-value of .0160; and substance abuse spending was marginally significant with a p-value of .0944. Though it may be assumed that these variables would be negatively (or inversely) correlated with opioid overdose death rates (i.e., opioid overdose death rates would decrease with the existence of these policies), this was not the case. In fact, each of these significant variables was positively correlated with the opioid overdose death rate (see Table 1).

Table 1

Correlations Between Variables and Opioid Overdose Death Rate 2017 Across all 50 States & DC

Opioid Overdose Death Rate (2017)	1
Poverty Rate	0.05
Opioid Prescription Rate	-0.02
Unemployment Rate	0.17
Democrat Percentage	-0.23
White Race Percentage	0.16
Non-Metro Populations	-0.17
MAT	0.53
Good Samaritan Laws	0.23
Syringe Exchange Programs	0.35
PDMP	-0.18
Prescription Limits	0.34
Naloxone Laws	-0.03
Substance Abuse Spending	0.24

Despite these results, all the variables were still regressed against the opioid overdose death rate (See Appendix for regression output). The R-Squared for the model is 62.24%. The non-metro population variable was significant with a P-value of .029 and a regression coefficient of -21.06. The MAT variable was also significant with a P-value of .001 and a regression coefficient of 6.45.

Once again, these results are perplexing. Initially, one would assume that the non-metro variable should have a positive regression coefficient, meaning opioid overdose deaths increase with rurality, as literature suggests. Similarly, one would hope that the MAT variable would have a negative regression coefficient, meaning that opioid overdose deaths decrease with MAT availability; however, this does not appear to be the case. Regression results for the MAT variable and positive correlations for other policy variables likely indicate that states with high overdose rates are still struggling to address the opioid crisis. For example, despite policy changes, West Virginia still has the highest opioid overdose rate of all the states (Snoderly). The results may also reflect that relationships between the policy variables included in these analyses and overdose rates are not clear. For example, as discussed, efforts to restrict opioid prescribing have been offset by increases in illegal opioid use.

To further examine relationships between overdose death rates and state background and policy variables, the correlation and regression process was repeated for the ten states with the highest opioid overdose death rates (See Appendix for regression output). In assessing correlations, only prescription limits was significant at a p-value of .0282 for the high opioid overdose states; however, most variables included in the analysis were correlated in the expected direction with opioid overdose deaths. For instance, the poverty, opioid prescription, unemployment, white race, and non-metro variables for the ten highest opioid overdose states were all positively correlated with opioid overdose deaths, meaning that as the values of these variables increased, so did the opioid overdose death rates. Furthermore, in the ten lowest opioid overdose states, the MAT, syringe exchange, PDMP, prescription limits, and substance abuse spending variables were all inversely related with opioid overdose death rates, meaning that these policies were associated with decreases in opioid overdose deaths. This suggests that the middle 30 states

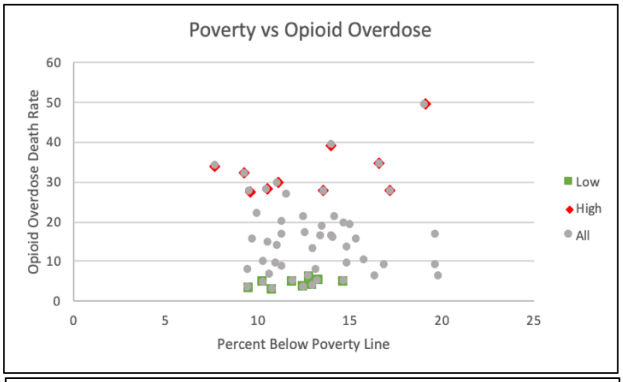
are muddling the correlations and regression results spanning all 50 states and DC for reasons that are unclear. See Table 2 for correlations for the ten high and ten low opioid overdose states.

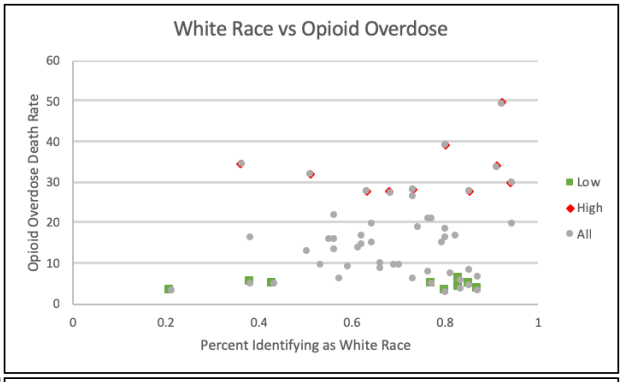
Table 2

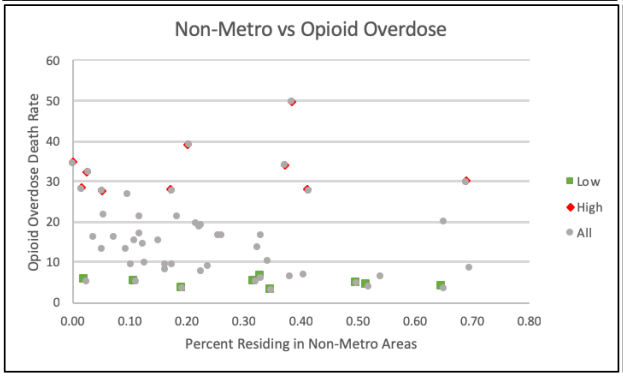
Correlations Between Variables and Opioid Overdose Death Rate 2017

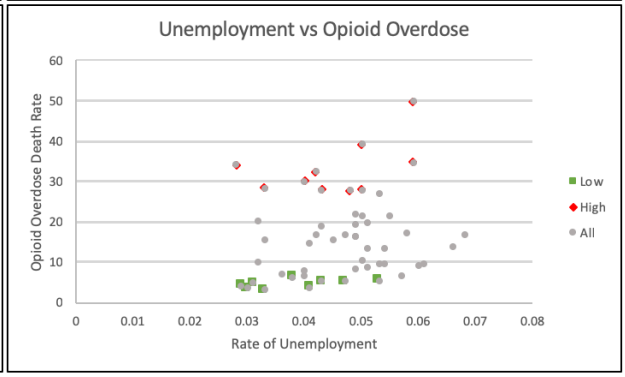
	10 Highest Overdose states	10 Lowest Overdose States
Opioid Overdose Death Rate (2017)	**1**	**1**
Poverty Rate	0.51	0.51
Opioid Prescription Rate	0.33	-0.35
Unemployment Rate	0.5	0.52
Democrat Percentage	-0.09	-0.21
White Race Percentage	0.24	0.04
Non-Metro Populations	0.15	-0.35
MAT	-0.19	-0.2
Good Samaritan Laws	0.16	-0.69
Syringe Exchange Programs	-0.4	-0.09
PDMP	-0.08	0.50
Prescription Limits	-0.69	-0.69
Naloxone Laws	0.36	-0.16
Substance Abuse Spending	-0.31	-0.26

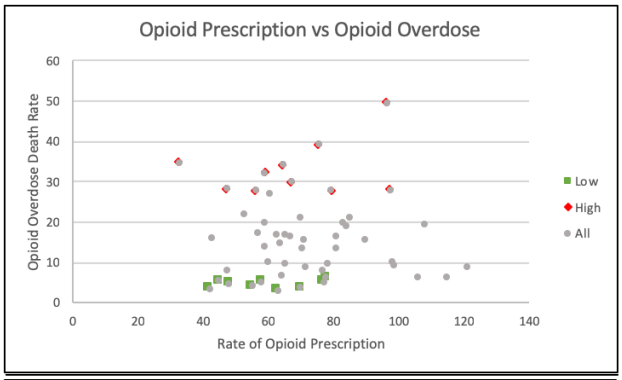
The figures below present graphical representations of each of the independent variables against the dependent variable, opioid overdose death rate, for all 50 states and the District of Columbia. Two findings in particular should be noted. First, looking at the opioid prescription rate plot, the highest overdose states (demonstrated by red diamonds) have very similar opioid prescription rates compared to the other 40 states. This reflects the decrease in opioid prescribing since 2011. Second, the substance abuse spending plot clearly demonstrates that the highest opioid overdose states, on average, seem to spend much less on substance abuse treatment per capita as reported in the data. This suggests that these high opioid overdose states should find ways (e.g., federal grants, reallocation of state budget funds) to increase their substance abuse treatment spending to address the opioid crisis.

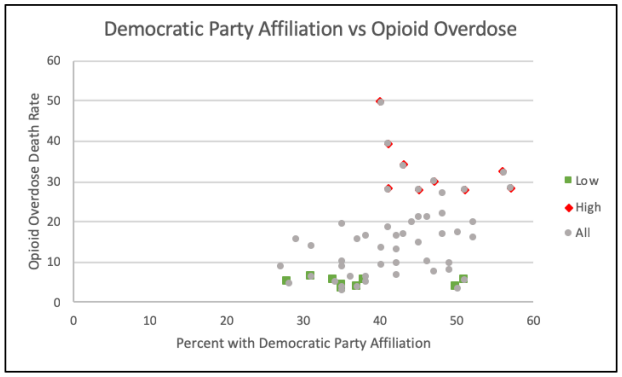

Poverty vs Opioid Overdose
Opioid Overdose Death Rate
Percent Below Poverty Line
Low
High
All

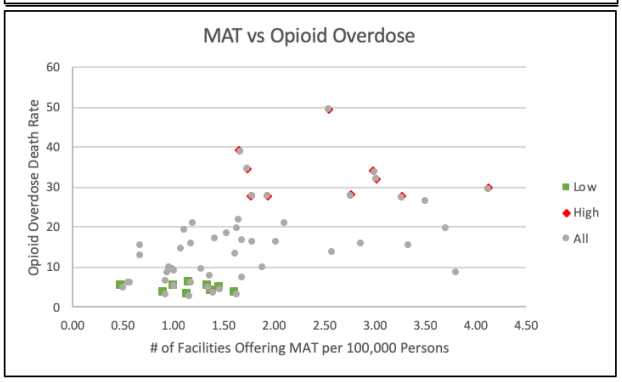

White Race vs Opioid Overdose
Opioid Overdose Death Rate
Percent Identifying as White Race
Low
High
All

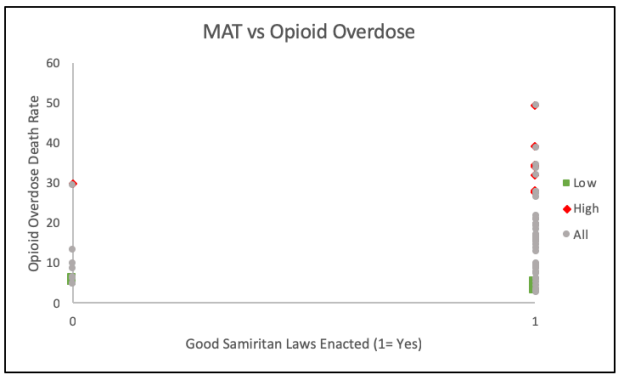

Non-Metro vs Opioid Overdose
Opioid Overdose Death Rate
Percent Residing in Non-Metro Areas
Low
High
All

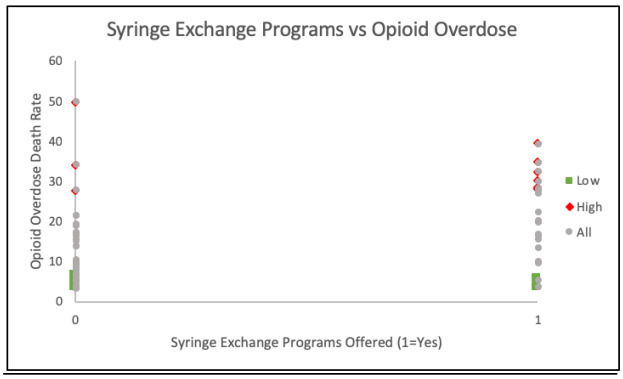

Unemployment vs Opioid Overdose
Opioid Overdose Death Rate
Rate of Unemployment
Low
High
All

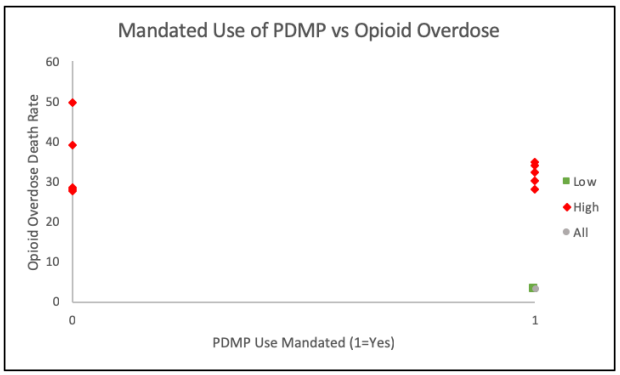

Opioid Prescription vs Opioid Overdose
Opioid Overdose Death Rate
Rate of Opioid Prescription
Low
High
All

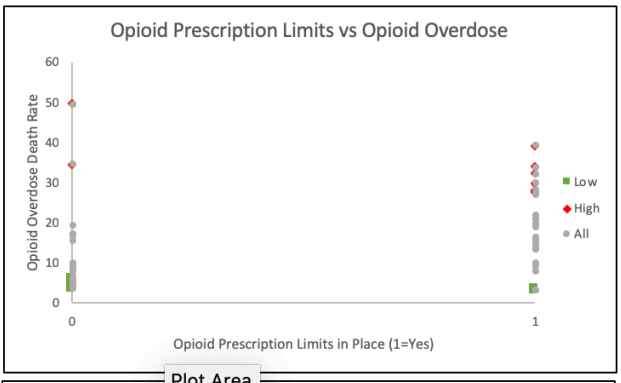

Democratic Party Affiliation vs Opioid Overdose
Opioid Overdose Death Rate
Percent with Democratic Party Affiliation
Low
High
All

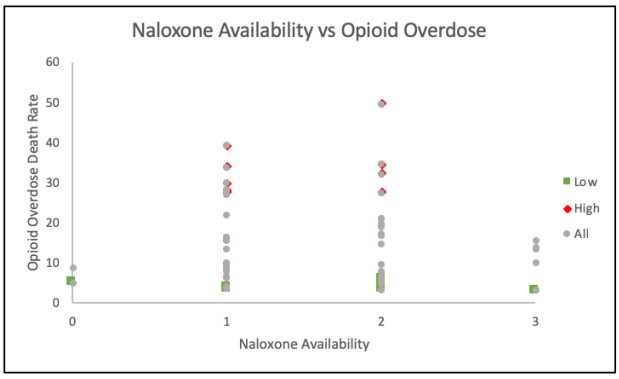

MAT vs Opioid Overdose
Opioid Overdose Death Rate
# of Facilities Offering MAT per 100,000 Persons
Low
High
All

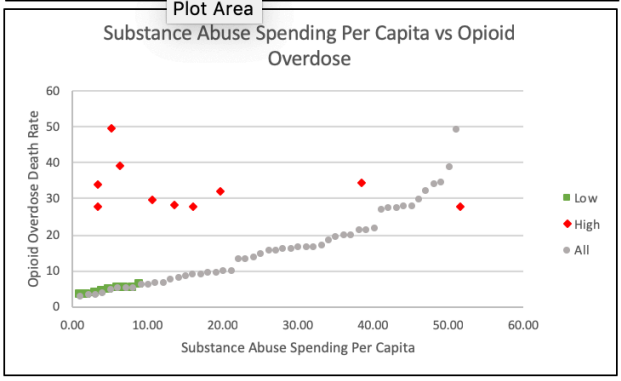

MAT vs Opioid Overdose
Opioid Overdose Death Rate
Good Samiritan Laws Enacted (1= Yes)
Low
High
All











Correlation analyses based on the ten highest overdose states show that the contributing factors discussed in this paper are related to opioid overdose deaths, to at least some degree in states with the most severe opioid crises. Further, this analysis demonstrated that current policy, such as MAT, syringe exchange programs, PDMPs, prescription limits, and increased substance abuse spending are contributing, to at least some degree, to decreasing opioid overdose death rates. Analyses that included all states indicate that states are in fact not affected equally by contributing

factors. These analyses also suggest that the combination of current drug policies may produce mixed results in decreasing overdose deaths.

Chapter V: Thesis Conclusion

Since the mid-1990s, prescription opioid use has increased. The undisclosed addictive nature of opioid drugs and aggressive marketing by pharmaceutical manufacturers resulted in unprecedented amounts of opioid prescriptions circulating in the US, leading to a national health emergency. Now, this crisis extends beyond prescription opioids to include illicit drugs like heroin and synthetically made fentanyl, both of which are much more potent and dangerous than their prescription counterparts. As a result, intravenous drug use has risen leading to outbreaks of HIV and hepatitis.

This thesis identified the root factors associated with this crisis. On a national level, factors include: a change in the way physicians viewed and treated pain; aggressive, targeted marketing by "big pharma;" and a lack of physician pain management education, leading to over prescribing. Additional factors, which led to a disparity in opioid use across states, include: demographic characteristics of those most likely to be prescribed opioids, such as middle-aged white males; those covered by Medicaid or Medicare; rurality and its relation to poverty, physically laborious jobs, and the ease at which cultural drug use spreads; and finally, at risk populations, such as those with mental illness, previous drug users, and those involved in the criminal justice system.

Policy responses, such as prescription limits, ADFs, and PDMPs, focused on reducing the availability of prescription opioids, with the belief that cutting off supply would control the crisis. However, this was not the case. Instead, these policies failed to address those with existing OUD, driving users physically dependent on opioids to turn to illegal drugs. As a result, lawmakers have introduced bills to increase penalties for trafficking in these illegal drugs. Fortunately, treatment

policies to help those with OUD reach recovery, while also supporting the families of those affected, such as MAT, increased access to naloxone, syringe service programs, drug courts, and Good Samaritan laws, and efforts to support the families of those affected, have increased in recent years.

Progress is evident, but an end to the crisis is still not in sight. Barriers like stigma, a lack of funding and infrastructure, and regulation still impede policies from achieving their full impact. Finally, some of the underlying causes of drug use disorders identified in this thesis are still not being addressed. For example, the policies discussed in this thesis do not address "eroding economic opportunity," which can lead to feelings of hopelessness and a propensity for increased drug use (Dasgupta 182). Further, a lack of alternative, affordable treatment options for pain, especially in rural areas, are still few and far between. Current policies will continue to make a positive impact, but until these other underlying issues are addressed, the crisis will continue to exist. This thesis advocates for further research regarding OUD, such as analyzing the policies of other countries that have struggled with and overcome similar opioid crises.

Appendix

Data Table for Regression Analyses

Exhibit 1														
State	% Below Federal Poverty Level	% Living in Non-Metro Areas	% of White Race	Unemployment Rate	Opioid Prescription Rate per 100 Persons	% Identifying with Democrat Party	Opioid Overdose Death per 100,000 Persons	# of Facilities Offering MAT per 100,000 Persons	Existence of Good Samaritan Laws	Existence of Syringe Exchange Programs	State Mandated Use of PDMP	Existence of Opioid Prescripition limits	Level of Naloxone Access	Substance Abuse Spending per Capita
Year	2016	2017	2016	2016	2016	2017	2017	2017	2017	2017	2015	2017	2017	2013
Alabama	17%	23%	66%	6%	121	35%	9	0.92	1	0	0	0	1	3
Alaska	11%	32%	61%	7%	58.9	31%	13.9	2.57	1	0	0	1	3	62
Arizona	15%	5%	56%	5%	70.2	40%	13.5	1.61	0	0	1	1	3	2
Arkansas	16%	38%	73%	4%	114.6	36%	6.5	0.57	1	0	1	0	1	1
California	13%	2%	38%	5%	44.8	51%	5.3	1.00	1	1	0	0	2	
Colorado	10%	13%	69%	3%	59.8	46%	10	1.87	1	1	1	1	1	4
Connecticut	10%	5%	68%	5%	55.9	51%	27.7	3.26	1	0	1	1	2	51
Delaware	14%	17%	63%	4%	79.2	45%	27.8	1.77	1	1	1	1	1	16
District of Columbia	17%	0%	36%	6%	32.5	0%	34.7	1.73	1	1		0	2	38
Florida	14%	3%	55%	5%	66.6	42%	16.3	1.16	1	0	0	1	1	4
Georgia	15%	17%	53%	5%	77.8	42%	9.7	0.98	1	0	1	0	2	1
Hawaii	10%	19%	21%	3%	41.9	50%	3.4	0.91	1	1	0	1	2	
Idaho	13%	33%	83%	4%	77.6	31%	6.2	1.16	0	0	0	0	2	12
Illinois	13%	11%		6%	56.8	50%	17.2	1.40	1	0	0	0	2	7
Indiana	14%	22%	80%	4%	83.9	41%	18.8	1.51	1	0	1	1	2	2
Iowa	11%	40%	87%	4%	64	42%	6.9	0.92	0	0	0	0	2	6
Kansas	12%	32%	77%	4%	76.9	34%	5.1	1.34	0	0	0	0	0	5
Kentucky	17%	41%	85%	5%	97.2	41%	27.9	1.93	1	1	1	1	1	3
Louisiana	20%	16%	59%	6%	98.1	40%	9.3	1.00	1	0	1	1	1	8
Maine	11%	69%	94%	4%	66.9	47%	29.9	4.12	0	1	0	1	1	11
Maryland	9%	2%	51%	4%	58.7	56%	32.2	3.01	1	1	0	1	2	20
Massachusetts	11%	1%	73%	3%	47.1	57%	28.2	2.76	1	1	1	1	1	13
Michigan	14%	18%	76%	5%	84.9	45%	21.2	1.18	1	0	0	1	2	3
Minnesota	10%	22%	81%	4%	46.9	47%	7.8	1.67	1	0	1	1	1	21
Mississippi	20%	54%	57%	6%	105.6	38%	6.4	0.54	1	0	0	0	1	0
Missouri	13%	25%	80%	5%	80.4	38%	16.5	1.77	1	0		1	1	7
Montana	13%	65%	87%	4%	69.8	37%	3.6	1.62	1	0	0	0	1	7
Nebraska	11%	35%	80%	3%	62.8	35%	3.1	1.15	1	0	0	1	3	13
Nevada	13%	9%	50%	5%	80.7	42%	13.3	0.67	1	1	1	1	1	3
New Hampshire	8%	37%	91%	3%	64.3	43%	34	2.98	1	0	0	1	1	3
New Jersey	10%	5%	56%	5%	52.6	48%	22	1.63	1	1	1	1	1	12
New Mexico	20%	33%	38%	7%	65.1	48%	16.7	2.01	1	1	1	0	2	10
New York	14%	7%	56%	5%	42.7	52%	16.1	2.85	1	1	1	1	1	21
North Carolina	15%	22%	64%	5%	82.5	44%	19.8	1.63	1	1	1	1	2	12
North Dakota	10%	50%	85%	3%	47.8	28%	4.8	1.46	1	0	1	0	2	14
Ohio	14%	20%	80%	5%	75.3	41%	39.2	1.65	1	1	1	1	1	6
Oklahoma	16%	34%	66%	5%	97.9	35%	10.2	0.94	0	0	1	0	3	9
Oregon	13%	16%	76%	5%	76.3	49%	8.1	1.35	1	0	0	0	2	5
Pennsylvania	13%	11%	77%	6%	69.5	46%	21.2	2.09	1	0	0	1	2	4
Rhode Island	12%	9%	73%	5%	60.3	48%	26.9	3.49	1	1	1	1	1	10
South Carolina	15%	15%	64%	5%	89.4	37%	15.5	0.66	1	0	0	0	3	1
South Dakota	13%	52%	83%	3%	54.8	35%	4	1.38	1	0	0	0	1	13
Tennessee	15%	22%	74%	5%	107.5	35%	19.3	1.10	1	0	1	0	2	4
Texas	15%	11%	43%	5%	57.6	38%	5.1	0.49	0	0	0	0	2	1
Utah	10%	10%	79%	3%	70.4	29%	15.5	3.32	1	1	0	1	1	4
Vermont	11%	65%	94%	3%	58.6	52%	20	3.69	1	1	1	1	2	13
Virginia	11%	12%	62%	4%	63.4	45%	14.8	1.06	1	0	1	1	2	6
Washington	11%	10%	70%	5%	64.9	49%	9.6	1.27	1	1	1	1	1	8
West Virginia	19%	38%	92%	6%	96	40%	49.6	2.53	1	0	1	0	2	5
Wisconsin	11%	26%	82%	4%	62.2	43%	16.9	1.67	1	0	0	0	2	1
Wyoming	11%	69%	85%	5%	71.1	27%	8.7	3.80	0	0	0	0	0	60

Sources: "Distribution of Total Population by Federal Poverty Level;" State Fact Sheets; "Population Distribution by Race/Ethnicity;" "Unemployment Rate (Seasonally Adjusted);" "Opioid Overdose U.S. State Prescribing Rates, 2017;" "2017 U.S. Party Affiliation by State;" "Opioid Overdose Death Rates and All Drug Overdose Death Rates per 100,000 Population (Age-Adjusted);" "Facilities Providing Some Medication Assisted Treatment;" "Good Samaritan Overdose Prevention Laws;" "Laws Related to Syringe Exchange;" "Prescription Drug Monitoring Programs: Evidence-Based Practices to Optimize Prescriber Use;" "Opioid Prescription Limits and Policies by State;" The President's Commission on Combatting Drug Addiction and the Opioid Crisis; Substance Use Disorders and the Role of the States

Regression Output for All 50 States

```
. regress opioddeath_2017 poverty_2016 opoidperscription_2016 unemployent_2016 democrat_2017 white_2
> 16 population_nm_2016 mat_2017 samaritan_law_2017 syringeexchange_2017 PDMP_2015 perscription_limi
>  naloxone_np_2017 sa_spending_2013 adult_drug_court_2017
```

Source	SS	df	MS		
Model	3441.721	14	245.837214	Number of obs	= 51
Residual	2087.77819	36	57.9938386	F(14, 36)	= 4.24
				Prob > F	= 0.0002
Total	5529.49918	50	110.589984	R-squared	= 0.6224
				Adj R-squared	= 0.4756
				Root MSE	= 7.6154

opioddeath_2017	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
poverty_2016	.7764315	.7942181	0.98	0.335	-.8343174	2.38718
opoidperscription_2016	.0956526	.0958278	1.00	0.325	-.0986952	.2900005
unemployent_2016	66.51222	177.3201	0.38	0.710	-293.1096	426.1341
democrat_2017	-.0190478	.0124276	-1.53	0.134	-.0442522	.0061565
white_2016	24.22123	13.45635	1.80	0.080	-3.069504	51.51197
population_nm_2016	-21.06411	9.252889	-2.28	0.029	-39.82984	-2.298381
mat_2017	6.449007	1.840461	3.50	0.001	2.716378	10.18163
samaritan_law_2017	3.227803	3.274055	0.99	0.331	-3.412288	9.867894
syringeexchange_2017	4.153539	3.277883	1.27	0.213	-2.494315	10.80139
PDMP_2015	.0018758	.0081037	0.23	0.818	-.0145592	.0183108
perscription_limit	1.801982	3.105044	0.58	0.565	-4.495338	8.099303
naloxone_np_2017	2.242372	1.696609	1.32	0.195	-1.19851	5.683254
sa_spending_2013	-.0012496	.0074637	-0.17	0.868	-.0163867	.0138875
adult_drug_court_2017	1.637026	2.792402	0.59	0.561	-4.026227	7.300279
_cons	-36.13285	12.85911	-2.81	0.008	-62.21234	-10.05337

Regression Output for Ten Highest Overdose States*

```
. regress opioddeath_2017 poverty_2016 white_2016 perscription_limit opoidperscription_2016
```

Source	SS	df	MS		
Model	312.375511	4	78.0938777	Number of obs	= 10
Residual	119.800448	5	23.9600896	F(4, 5)	= 3.26
				Prob > F	= 0.1136
Total	432.175959	9	48.019551	R-squared	= 0.7228
				Adj R-squared	= 0.5010
				Root MSE	= 4.8949

opioddeath_2017	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
poverty_2016	-.8929892	.9304432	-0.96	0.381	-3.28477	1.498791
white_2016	6.191407	13.07462	0.47	0.656	-27.41797	39.80078
perscription_limit	-18.2553	6.907664	-2.64	0.046	-36.01201	-.4985811
opoidperscription_2016	.1801802	.1649448	1.09	0.324	-.2438238	.6041843
_cons	42.55078	14.00401	3.04	0.029	6.552324	78.54923

*Regression only includes statistically significant variables based on correlation matrixes.

Bibliography

"2015-2016 National Survey on Drug Use and Health: Model-Based Prevalence Estimates (50 States and the District of Columbia)." Substance Abuse and Mental Health Services Administration, U.S. Department of Health and Human Services, https://www.samhsa.gov/data/report/2015-2016nsduh-estimated-totals-state Accessed 7 Dec. 2018. Raw data.

"2017 U.S. Party Affiliation by State." 2017. *Gallup*, news.gallup.com/poll/226643/2017-party-affiliation-state.aspx. Accessed 15 Apr. 2019. Raw data.

Addiction. HBO, 2007.

Ahrnsbrak, Rebecca,et al. *Key Substance Use and Mental Health Indicators in the United States: Results from the 2016 National Survey on Drug Use and Health*. Publication no. SMA 17-5044, Rockville, Center for Behavioral Health Statistics and Quality, Substance Abuse and Mental Health Services Administration, 2017. NSDUH Series H-52.

Alderks, Cathie E. *TRENDS IN THE USE OF METHADONE, BUPRENORPHINE, AND EXTENDED-RELEASE NALTREXONE AT SUBSTANCE ABUSE TREATMENT FACILITIES: 2003-2015 (UPDATE)*. Substance Abuse and Mental Health Services Administration, 22 Aug. 2017.

"Annual Drug Overdose Report Shows Eight-Year Low in Prescription Opioid Deaths and Four-Year Low in Heroin Deaths in Ohio." *Ohio Department of Health*, 27 Sept. 2018, odh.ohio.gov/wps/portal/gov/odh/media-center/odh-news-releases/annual-drug-overdose-report. Accessed 24 Mar. 2019.

"Attendance at Religious Services by State." 2014. *Pew Research Center*, www.pewforum.org/religious-landscape-study/compare/attendance-at-religious-services/by/state/. Accessed 9 Apr. 2019. Raw data.

Austin, John. “Opioid Hot Spots ID’d in TX.” *Gainesville Daily Register*, https://www.gainesvilleregister.com/texas/news/opioid-hot-spots-id-d-in-tx/article_6a3c6898-ac9e-11e8-bc37-13df42a2db64.html. Accessed 19 Nov. 2018.

Bailey, Jared. Centers for Medicare & Medicaid Services. *Prescription Drug Monitoring Program: West Virginia*. Oct.2017.

Baker, David W. “The Joint Commission's Pain Standards: Origins and Evolution.” *The Joint Commission*, Oakbrook Terrace, IL, 2017.

Bixler, Danae et al., *Access to Syringe Services Programs — Kentucky, North Carolina, and West Virginia, 2013–2017*. MMWR Morb Mortal Wkly Rep 2018; 67:529-532. DOI: http://dx.doi.org/10.15585/mmwr.mm6718a5.

Brown, Raymond. "How New Hampshire Joined 'Hillbilly Elegy'; the Opioid and Heroin Crisis is Rife in our White Mountains." *Wall Street Journal (Online)*, Sep 10, 2017. *ProQuest*, http://ezproxy.lib.utexas.edu/login?url=https://search-proquest-com.ezproxy.lib.utexas.edu/docview/1937193671?accountid=7118.

Bureau of Drug and Alcohol Services. ***Substance Misuse Prevention (SMP) Coordinator's Manual.***

Carpenter, Christopher S., et al. “Economic Conditions, Illicit Drug Use, and Substance Use Disorders in the United States.” *Journal of Health Economics*, vol. 52, Mar. 2017, pp. 63–73. *ScienceDirect*, doi:10.1016/j.jhealeco.2016.12.009.

Ceniceros, Robert. “Bluegrass State Leads the Opioid Fight.” *Risk & Insurance*, 3 Aug. 2016, http://riskandinsurance.com/bluegrass-state-leads-opioid-fight-2/.

Centers for Disease Control and Prevention. Annual Surveillance Report of Drug-Related Risks and Outcomes – United States, 2017. Surveillance Special Report 1. Centers for Disease Control and Preventions, U.S. Department of Health and Human Services.

https://www.cdc.gov/drugoverdose/pdf/pubs/2017-cdc-drug-surveillance-report.pdf. Accessed 19 Nov. 2018.

Chang, Hsien-Yen, et al. "Relationship between High-Risk Patients Receiving Prescription Opioids and High-Volume Opioid Prescribers." *Addiction*, vol. 113, no. 4, Apr. 2018, pp. 677–86. *Wiley Online Library*, doi:10.1111/add.14068.

Chilcoat, Howard D., et al. "Decreased diversion by doctor-shopping for a reformulated extended release oxycodone product (OxyContin)." *Drug and Alcohol Dependence*, vol. 165, 1 Aug. 2016, pp. 221-28.

Corrigan, Patrick W., and Katherine Nieweglowski. "Stigma and the public health agenda for the opioid crisis in America." *International Journal of Drug Policy*, vol. 59, 2018, pp. 44-49.

"Current Population Survey." 2016. *United States Census Bureau*, www.census.gov/cps/data/cpstablecreator.html. Accessed 7 Dec. 2018. Raw data.

Dasgupta, Nabarun,PhD., M.P.H., Beletsky, Leo,J.D., M.P.H., & Ciccarone, Daniel,M.D., M.P.H. (2018). Opioid crisis: No easy fix to its social and economic determinants. *American Journal of Public Health, 108*(2), 182-186. doi:http://dx.doi.org.ezproxy.lib.utexas.edu/10.2105/AJPH.2017.304187

Daniulaityte, R., et al. "Illicit Use of Pharmaceutical Opioids among Young Polydrug Users in Ohio." *Addictive Behaviors*, vol. 34, no. 8, Aug. 2009, pp. 649–53. *ScienceDirect*, doi:10.1016/j.addbeh.2009.03.037.

Department of Health and Human Services, Substance Abuse and Mental Health Services Administration. ***An Introduction to Extended-Release Injectable Naltrexone*** *for the Treatment of People With Opioid Dependence*. 2012.

Dew, Brian, et al. “Social and Environmental Factors and Their Influence on Drug Use Vulnerability and Resiliency in Rural Populations.” *The Journal of Rural Health*, vol. 23, no. s1, pp. 16–21. *Wiley Online Library*, doi:10.1111/j.1748-0361.2007.00119.x.

Dhanda, Anjali, et al. “Patterns of opioid use during initial buprenorphine/naloxone treatment in relation to changes in opioid management laws in Kentucky.” *The American Journal on Addictions*, vol. 27, no. 7, Oct. 2018, pp. 560-66.

"Distribution of Total Population by Federal Poverty Level." 2017. *Henry J Kaiser Family Foundation*, KFF, www.kff.org/other/state-indicator/distribution-by-fpl/?currentTimeframe=0&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7. Accessed 7 Dec. 2018. Raw data.

"Drug Classifications, Schedule I, II, III, IV, V." *Balancing Drug Risks and Benefits*, Med Shadow,19 Mar. 2019, medshadow.org/resource/drug-classifications-schedule-ii-iii-iv-v/. Accessed 23 Mar. 2019.

“Drug Overdose Death Data.” *Centers for Disease Control and Prevention*, Centers for Disease Control and Prevention, 19 Dec. 2017, www.cdc.gov/drugoverdose/data/statedeaths.html

"Drug Scheduling." *United States Drug Enforcement Administration*, www.dea.gov/drug-scheduling. Accessed 23 Mar. 2019.

Dyer, Owen. "Trump and health department diverge on how to deal with opioid crisis." *BMJ*, 6 Mar. 2018.

“Facilities Providing Some Medication Assisted Treatment.” *Opioid & Health Indicators Database amFAR*, opioid.amfar.org/indicator/SMAT_fac. Accessed 15 Apr. 2019. Raw data.

Faryar, Kiran A., et al. “The Effects of Kentucky's Comprehensive Opioid Legislation on Patients Presenting with Prescription Opioid or Heroin Abuse to One Urban Emergency Department.” *The Journal of Emergency Medicine*, vol. 53, no. 6, Dec. 2017, pp. 805-14.

Fleming, Michael F., et al. “Substance Use Disorders in a Primary Care Sample Receiving Daily Opioid Therapy.” *The Journal of Pain*, vol. 8, no. 7, July 2007, pp. 573–82. *ScienceDirect*, doi:10.1016/j.jpain.2007.02.432.

Frieden, Thomas, and Debra Houry. "Reducing the Risks of Relief — The CDC Opioid-Prescribing Guideline." *The New England Journal of Medicine*, vol. 374, no. 16, 21 Apr. 2016, pp. 1501-04.

Freeman, Patricia R. "Pharmacists' role in opioid overdose: Kentucky pharmacists' willingness to participate in naloxone dispensing." *Journal of the American Pharmacists Association*, vol. 57, no. 2, 2017, pp. S28-S33.

Gitis, Ben. "State-by-State: The Labor Force and Economic Effects of the Opioid Crisis. *American Action Forum*, 12 Sept. 2018, www.americanactionforum.org/project/opioid-state-summary/#back-to-map. Accessed 9 Apr. 2019.

“Good Samaritan Overdose Prevention Laws.” *PDAPS*, Legal Science, pdaps.org/datasets/good-samaritan-overdose-laws-1501695153. Accessed 15 Apr. 2019. Raw data.

Governor's Cabinet, Opiate Action Team. ***Combating the Opiate Crisis in Ohio*.** Sept. 2018.

Governor's Cabinet, Opiate Action Team. ***New Strategies to Combat the Opiate Crisis in Ohio***. 2018.

“Governor Wolf Declares Heroin and Opioid Epidemic a Statewide Disaster Emergency.” *Commonwealth of Pennsylvania*, 10 Jan. 2018, www.governor.pa.gov/governor-wolf-declares-heroin-and-opioid-epidemic-a-statewide-disaster-emergency/. Accessed 24 Mar. 2019.

Grecu, Anca M., et al. "Mandatory Access Prescription Drug Monitoring Programs and Prescription Drug Abuse." *Journal of Policy Analysis and Management*, vol. 38, no. 1, 15 Oct. 2018.

Grigoras, Christos A., et al. "Correlation of Opioid Mortality with Prescriptions and Social Determinants: A Cross-sectional Study of Medicare Enrollees." *Drugs*, vol. 78, no. 1, Jan.-Feb. 2018, pp. 111-21.

Gupta, Rahul. Interview. By Robin Young. *Here & Now*, WBUR, 11 May 2018, www.wbur.org/hereandnow/2018/05/11/opioid-crisis-west-virginia. Accessed 24 Mar. 2019.

Gupta, Rahul, et al. "Legislation will create office of drug control policy in West Virginia." *West Virginia Medical Journal*, vol. 113, no. 3, 2017, p. 29. *Health Reference Center Academic*, http://link.galegroup.com/apps/doc/A494585699/HRCA?u=txshracd2598&sid=HRCA&xid=b371c011. Accessed 26 Mar. 2019.

Guy, Gery P. "Vital Signs: Changes in Opioid Prescribing in the United States, 2006–2015." *MMWR. Morbidity and Mortality Weekly Report*, vol. 66, 2017. *www.cdc.gov*, doi:10.15585/mmwr.mm6626a4.

Haddy, Loretta, et al. Bureau for Public Health, Department of Health and Human Resources. *West Virginia Drug Overdose Deaths Historical Overview 2001-2015*. Charleston, 17 Aug. 2017.

Hahn, Kathryn L. "Strategies to Prevent Opioid Misuse, Abuse, and Diversion That May Also Reduce the Associated Costs." *American Health & Drug Benefits*, vol. 4, no. 2, Mar.-Apr. 2011, pp. 107-14.

"Health Insurance Coverage of the Total Population." 2017. *Henry J Kaiser Family Foundation*, KFF, www.kff.org/other/state-indicator/totalpopulation/?currentTimeframe=0&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D. Accessed 7 Dec. 2018. Raw data.

Hilliard, Paul E. "The Prescription Opioid Abuse Crisis in America." *Advances in Anesthesia*, vol. 33, no. 1, 2015, pp. 175–89. *Crossref*, doi:10.1016/j.aan.2015.07.010.

Hopkins, Marcus J. "Efficacy of Syringe Services Programs in Preventing the Spread of HCV." *communityaccessnationalnetwork*, 21 May 2018, communityaccessnationalnetwork.wordpress.com/2018/05/21/efficacy-of-syringe-services-programs-in-preventing-the-spread-of-hcv/. Accessed 24 Mar. 2019.

Huber, Mary. "'We Are Not Immune': How the Opioid Crisis Is Hitting Central Texas." *Austin American*, https://www.statesman.com/news/20180609/we-are-not-immune-how-the-opioid-crisis-is-hitting-central-texas. Accessed 19 Nov. 2018.

Hughes, Arthur., et al. "Prescription Drug Use and Misuse in the United States: Results from the 2015 National Survey on Drug Use and Health." *NSDUH Data Review*, SAMHSA, Sept. 2016, www.samhsa.gov/data/sites/default/files/NSDUH-FFR2-2015/NSDUH-FFR2-2015.htm.

Jacobs, Harrison. "Here's Why the Opioid Epidemic Is so Bad in West Virginia — the State with the Highest Overdose Rate in the US." *Business Insider*, https://www.businessinsider.com/why-the-opioid-epidemic-is-so-bad-in-west-virginia-2016-4. Accessed 19 Nov. 2018.

Jarvis, Jake. "West Virginia lawmakers approve rule changes to combat opioid epidemic." *WVNews*, 12 Nov. 2018, www.wvnews.com/news/wvnews/west-virginia-lawmakers-approve-rule-changes-to-combat-opioid-epidemic/article_bdeae0c1-bd46-56f5-9981-15c3eb899699.html. Accessed 24 Mar. 2019.

Johnson, Charles M. "West Virginia Adopts New Rules to Combat the Opioid Epidemic." *Frost Brown Todd Attorneys*, 19 Nov. 2018, www.healthlawmattersblog.com/west-virginia-adopts-new-rules-to-combat-opioid-epidemic. Accessed 24 Mar. 2019.

Johnson, Quentin. "Case Study: County-Level Responses to the Opioid Crisis in Northern Kentucky." *The Journal of Law, Medicine & Ethics*, vol. 46, no. 2, June 2018, pp. 382–86. *SAGE Journals*, doi:10.1177/1073110518782947.

Jonas, Adam B., et al. “OxyContin® as Currency: OxyContin® Use and Increased Social Capital among Rural Appalachian Drug Users.” *Social Science & Medicine*, vol. 74, no. 10, May 2012, pp. 1602–09. *ScienceDirect*, doi:10.1016/j.socscimed.2011.12.053.

Justice and Public Safety Cabinet, Kentucky Office of Drug Control Policy. ***Overdose Fatality Report***. 2016.

Katz, Josh. "Why a City at the Center of the Opioid Crisis Gave Up a Tool to Fight It." *New York Times*, 27 Apr. 2018, www.nytimes.com/interactive/2018/04/27/upshot/charleston-opioid-crisis-needle-exchange.html. Accessed 24 Mar. 2019.

Kemp, Daniel. "Substance Abuse Treatment Advisory Committee Announces KY Kids Recovery Grant Recipients." *Kentucky.gov*, 11 Aug. 2014, kentucky.gov/Pages/Activity-Stream.aspx?viewMode=ViewDetailInNewPage&eventID=%7B29F671A8-F2B7-43B5-AFE3-9DE0EC9EA4F3%7D&activityType=PressRelease. Accessed 25 Mar. 2019.

Kentucky State, General Assembly, House of Representatives. House Bill 124, Chapter 222. 2018 General Assembly, passed 2 Apr. 2018.

Kertesz, Stefan. "What's Wrong With Just Counting the Patients on High Dose Opioids and Calling that Bad Care? (3 addiction docs respond to CMS)." *Medium*, 9 Feb. 2018, medium.com/@StefanKertesz/whats-wrong-with-just-counting-the-patients-on-high-dose-opioids-and-calling-that-bad-care-3f585ceac22e. Accessed 23 Mar. 2019.

Keyes, Katherine M., et al. “Understanding the Rural-Urban Differences in Nonmedical Prescription Opioid Use and Abuse in the United States.” *American Journal of Public Health; Washington*, vol. 104, no. 2, Feb. 2014, pp. e52-9.

Kobus, Amy M., et al. “Correlates of Higher Dose Opioid Medication Use for Low Back Pain in Primary Care.” *The Journal of Pain : Official Journal of the American Pain Society*, vol. 13, no. 11, Nov. 2012, pp. 1131–38. *PubMed Central*, doi:10.1016/j.jpain.2012.09.003.

Knight, Kelly R., et al. “Opioid Pharmacovigilance: A Clinical-Social History of the Changes in Opioid Prescribing for Patients with Co-Occurring Chronic Non-Cancer Pain and Substance Use.” *Social Science & Medicine*, vol. 186, Aug. 2017, pp. 87–95. *ScienceDirect*, doi:10.1016/j.socscimed.2017.05.043.

“Laws Related to Syringe Exchange.” 28 Sept. 2017. *Centers for Disease Control and Prevention*, www.cdc.gov/hepatitis/policy/SyringeExchange.htm. Accessed 15 Apr. 2019. Raw data.

Leece, Pamela, et al. "Tamper-resistant drugs cannot solve the opioid crisis." *CMAJ: Canadian Medical Association Journal*, 14 July 2015, p. 717+. *Science In Context*, http://link.galegroup.com.ezproxy.lib.utexas.edu/apps/doc/A421214585/SCIC?u=txshracd2598&sid=SCIC&xid=c858c369. Accessed 23 Mar. 2019.

Leins, Casey. “New Hampshire: Ground Zero for Opioids.” *US News & World Report*, https://www.usnews.com/news/best-states/articles/2017-06-28/why-new-hampshire-has-one-of-the-highest-rates-of-opioid-related-deaths. Accessed 28 Oct. 2018.

Luu, H. et al. “Trends and Patterns of Opioid Analgesic Prescribing: Regional and Rural-Urban Variations in Kentucky From 2012 to 2015.” *The Journal of Rural Health. Wiley Online Library*. doi:10.1111/jrh.12300

Macy, Beth. *Dopesick: Dealers, Doctors, and The Drug Company That Addicted America*. Little, Brown and Company, 2018.

Massatti, Rick, compiler. *Naloxone (Narcan®) Administration in Ohio 2003-2012*. Report no. 2, Columbus, Ohio Department of Mental Health and Addiction Services, Nov. 2013.

Meinhofer, Angelica, and Allison E. Witman. "The role of health insurance on treatment for opioid use disorders: Evidence from the Affordable Care Act Medicaid expansion." *Journal of Health Economics*, vol. 60, July 2018, pp. 177-97.

"Methadone." *Substance Abuse and Mental Health Services Administration*, U.S. Department of Health and Human Services, 28 Sept. 2015, www.samhsa.gov/medication-assisted-treatment/treatment/methadone. Accessed 23 Mar. 2019.

McKnight, Erin. **"**Statewide Opioid Prescriptions and the Prevalence of Adolescent Opioid Misuse in Ohio." *The American Journal of Drug and Alcohol Abuse, vol. 43, no. 3*. https://www.tandfonline.com/doi/full/10.1080/00952990.2016.1216999. Accessed 6 Dec. 2018.

National Academies of Sciences, Engineering, and Medicine. Trends in Opioid Use, Harms, and Treatment. *Pain Management and the Opioid Epidemic: Balancing Societal and Individual Benefits and Risks of Prescription Opioid Use.*, edited by Richard J. Bonnie et al., Washington DC,National Academies Press, 2017.

New Hampshire Governor's Commission on Alcohol and Drug Abuse Prevention, Treatment and Recovery. 1 Mar. 2018.

New Hampshire PDMP. www.newhampshirepdmp.com. Accessed 24 Mar. 2019.

New Hampshire State, General Court, House of Representatives. **House Bill 271**. 2015 General Court, passed 2 June 2015.

New Hampshire State, General Court. Opioid Prescribing. N.H. Rev. Stat. Ann., section 329:9, 12 Nov. 2016.

Ohio Department of Health. ***Prescription Opioid Overdose Deaths Down*** *Almost 28 Percent Since 2011, and to Eight-Year Low*. 2017. Ohio Drug Overdose Data: General Findings.

"Opioid Addiction 2016 Facts and Figures." American Society of Addiction Medicine. https://www.asam.org/docs/default-source/advocacy/opioid-addiction-disease-facts-figures.pdf

"Opioid Epidemic." *Pennsylvania Department of Health*, Commonwealth of Pennsylvania, www.health.pa.gov/topics/disease/Opioids/Pages/Opioids.aspx. Accessed 24 Mar. 2019.

"Opioid Overdose." *Centers for Disease Control and Prevention*, Centers for Disease Control and Prevention, 19 Oct. 2018, www.cdc.gov/drugoverdose/index.html.

"Opioid Overdose Death Rates and All Drug Overdose Death Rates per 100,000 Population (Age-Adjusted)." *Henry J Kaiser Family Foundation*, www.kff.org/other/state-indicator/opioid-overdose-deathrates/?currentTimeframe=0&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D. Accessed 15 Apr. 2019. Raw data.

"Opioid Overdose U.S. State Prescribing Rates, 2017." 31 July 2017. *Centers for Disease Control and Prevention*, www.cdc.gov/drugoverdose/maps/rxstate2017.html. Accessed 15 Apr. 2019. Raw data.

Opioids and Prescription Drug Monitoring Program. 2017. Pennsylvania State Health Assessment.

"Opioid Prescription Limits and Policies by State." 11 Feb. 2019. *Ballotpedia*, ballotpedia.org/Opioid_prescription_limits_and_policies_by_state. Accessed 15 Apr. 2019. Typescript.

"Opioid Summaries by State." *National Institute on Drug Abuse*, National Institute on Drug Abuse, 28 Feb. 2018, www.drugabuse.gov/drugs-abuse/opioids/opioid-summaries-by-state.

Parker, Andrew M., et al. "State Responses to the Opioid Crisis." *The Journal of law, medicine & ethics*, vol. 46, no. 2, 1 June 2018, pp. 367-81.

Penm, Jonathan, et al. “Statewide Cross-Sectional Survey of Emergency Departments’ Adoption and Implementation of the Ohio Opioid Prescribing Guidelines and Opioid Prescribing Practices.” *BMJ Open*, vol. 8, no. 6, June 2018, p. e020477. *bmjopen.bmj.com*, doi:10.1136/bmjopen-2017-020477.

Penm, Jonathan, et al. "Strategies and policies to address the opioid epidemic: A case study of Ohio." *Journal of the American Pharmacists Association*, vol. 57, 2017, pp. S148-S153.

Pennsylvania Department of Health and Pennsylvania Department of Drug and Alcohol Programs. *Pennsylvania's Response to The Heroin and Prescription Opioid Crisis*. By Kimberly **Early** and Derrick Pelletier, 18 Oct. 2018.

Pennsylvania Department of Health. ***Standing Order: Naloxone Prescription for Overdose Prevention***. Report no. DOH-002, 18 Apr. 2018.

"Pennsylvania's Opioid Epidemic - Are rural areas suffering the most?" *Pugliese Associates, Inc.*, puglieseassociates.com/pennsylvanias-opioid-epidemic-rural-areas-suffering/. Accessed 26 Mar. 2019.

Piper, Brian J., et al. “Trends in Medical Use of Opioids in the U.S., 2006–2016.” *American Journal of Preventive Medicine*, vol. 54, no. 5, May 2018, pp. 652–60. *ScienceDirect*, doi:10.1016/j.amepre.2018.01.034.

Phillips, Margie J., et al. *The effectiveness of needle exchange programs in the United States and West Virginia*. Marshall University, Apr. 2018.

"Population Distribution by Metropolitan Status." 2016. *Henry J Kaiser Family Foundation*, KFF, www.kff.org/other/state-indicator/metropolitan-distribution/?currentTimeframe=0&sortModel=%7B%22colId%22%3A%22Location%22%2C%22sort%22%3A%22asc%22%7D. Accessed 7 Dec. 2018. Raw data.

"Population Distribution by Race/Ethnicity." 2017. *Henry J Kaiser Foundation*, KFF,www.kff.org/other/state-indicator/distribution-by-raceethnicity/?currentTimeframe=0&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D. Accessed 7 Dec. 2018. Raw data.

"Preventing HIV And Hepatitis Among People Who Inject Drugs And Their Partners." *HIV.gov*, U.S. Department of Health & Human Services, 20 Sept. 2017, www.hiv.gov/federal-response/policies-issues/syringe-services-programs. Accessed 23 Mar. 2019.

Putnam, Robert D. *Bowling Alone*. New York, Simon & Schuster.

Ramer, Holly. "New Hampshire envisions network of regional hubs to fight opioid addiction." *Portland Press Herald*, 18 Aug. 2018, www.pressherald.com/2018/08/18/new-hampshire-envisions-network-of-regional-hubs-to-fight-opioid-addiction/. Accessed 24 Mar. 2019.

“Rural Population by State: 2011 - 2015.” *U.S. Census Bureau*. Accessed 15 Apr. 2019. Map.

“Rural / Urban PA.” *The Center for Rural Pennsylvania*, www.rural.palegislature.us/rural_urban.html. Accessed 9 Apr. 2019.

Sebastian, Terry, and Jennifer Brislin. "RSS Gov. Beshear Announces Funding to Increase Substance Abuse Treatment for Pregnant Women." *Kentucky.gov*, 4 Aug. 2015, kentucky.gov/Pages/Activity-Stream.aspx?viewMode=ViewDetailInNewPage&eventID=%7BCDF9930C-BED1-439E-9638-C0CA03811F3F%7D&activityType=PressRelease. Accessed 25 Mar. 2019.

Seelye, Katharine Q. "'Perfect Storm' Fuels New Hampshire Opioid Crisis." *New York Times*, 21 Jan. 2018, p. A18(L). *Opposing Viewpoints in Context*, http://link.galegroup.com.ezproxy.lib.utexas.edu/apps/doc/A523960617/OVIC?u=txshracd2598&sid=OVIC&xid=f3c9119d. Accessed 19 Nov. 2018.

Sigo, Shelly. “Kentucky May Become First State to Tax Opioids to Fund Its State Budget.” *Bond Buyer,* vol. 390, no. 34869, Mar. 2018, p.1. *EBSCOhost,* search.ebscohost.com/login.aspx?direct=true&db=bth&AN=128319769&site=ehost-live.

Snoderly, JoAnn. "West Virginia again leads nation in drug overdose deaths." *The Exponent Telegram*, 29 Nov. 2018, www.wvnews.com/theet/news/west-virginia-again-leads-nation-in-drug-overdose-deaths/article_42d95e63-cd30-5e38-8ecd-cba357d923d9.html. Accessed 22 Apr. 2019.

Soelberg, Cobin D., and Raeford E. Brown. "The US Opioid Crisis Current Federal and State Legal Issues." *Anesthesia & Analgesia*, vol. 125, no. 5, Nov. 2017, pp. 1675-81.

Spotlight on Pennsylvania Leading-Edge Practices and Next Steps in Ending the Opioid Epidemic. American Medical Association, Manatt, & Pennsylvania Medical Society, Dec. 2018. *End Opioid Epidemic*, www.end-opioid-epidemic.org/wp-content/uploads/2018/12/AMA-Manatt-PAMED-spotlight-analysis-FINAL-for-release.pdf. Accessed 24 Mar. 2019.

State Fact Sheets. 6 Mar. 2019. *United States Department of Agriculture Economic Research Service*, data.ers.usda.gov/reports.aspx?StateFIPS=01&StateName=Alabama&ID=17854. Accessed 15 Apr. 2019. Raw data.

"State Laws: Rural Syringe Service Programs." *Harmreduction.org*, harmreduction.org/ruralsyringe/state-laws/. Accessed 24 Mar. 2019.

"State Occupational Injuries, Illnesses, and Fatalities." *United States Department of Labor*, Bureau of Labor Statistics, www.bls.gov/iif/oshstate.htm. Raw data.

Stelter, Anna. “Five Fast Facts about the Opioid Crisis in Texas.” *TEXAS HEALTH INSTITUTE*, http://www.texashealthinstitute.org/blog.html. Accessed 19 Nov. 2018

Substance Use Disorders and the Role of the States. State Substance Abuse Agency Spending. PDF file, Mar. 2015. Table.

"Sununu Signs Bill Allowing Needle Exchange Programs." *U.S. News & World Report*, 6 June 2017, www.usnews.com/news/best-states/new-hampshire/articles/2017-06-16/sununu-signs-bill-allowing-needle-exchange-programs. Accessed 24 Mar. 2019.

Sutherland, Paige. "Confusion Over Expanded Narcan Access Slows Roll-Out to N.H. First Responders." *New Hampshire Public Radio*, 16 July 2015, www.nhpr.org/post/confusion-over-expanded-narcan-access-slows-roll-out-nh-first-responders#stream/0. Accessed 24 Mar. 2019.

"The Heroin And Opioid Epidemic In Ohio." *The Bluffs Rehab*, 17 July 2018, www.bluffsrehab.com/blog/heroin-opioid-epidemic-ohio/. Accessed 24 Mar. 2019.

The Mayor's Task Force to Combat The Opioid Epidemic in Philadelphia. City of Philadelphia, 19 May 2017.

The PEW Charitable Trusts. **"Prescription Drug Monitoring Programs: Evidence-Based Practices to Optimize Prescriber Use."** Dec. 2016. Raw data.

The President's Commission on Combatting Drug Addiction and the Opioid Crisis. *Naloxone Access in Community Pharmacies*. PDF file, June 2017. Map.

"Total Population in U.S. Adult Correctional Systems by Correctional Status." 2016. *Henry J Kaiser Family Foundation*, KFF, www.kff.org/other/state-indicator/total-population-in-u-s-adult-correctional-systems-by-correctional-status/?currentTimeframe=0&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D. Accessed 7 Dec. 2018. Raw data.

"Unemployment Rate (Seasonally Adjusted)." Sept. 2017. *Henry J Kaiser Family Foundation*, KFF,www.kff.org/other/state-indicator/unemployment-

rate/?currentTimeframe=0&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D. Accessed 7 Dec. 2018. Raw data.

United States, Congress, House, Energy and Commerce. *Fentanyl: The Next Wave of the Opioid Crisis*. Testimony of Wilson M. **Compton**. National Institute on Drug Abuse, 21 Mar. 2017.

United States, Congress, Senate, Health, Education, Labor & Pensions. *The Federal Response to the Opioid Crisis*. Testimony of Francis **Collins**. Government Publishing Office, 5 Oct. 2017.

U.S. Department of Health and Human Services (HHS), Office of the Surgeon General, *Facing Addiction in America: The Surgeon General's Spotlight on Opioids.* Washington, DC: HHS, September 2018.

U.S. Department of Justice, Drug Enforcement Administration. *Lists of: Scheduling Actions Controlled Substances Regulated Chemicals*. Diversion Control Division, Dec. 2018.

Van Zee, Art. "The Promotion and Marketing of OxyContin: Commercial Triumph, Public Health Tragedy." *American Journal of Public Health*, vol. 99, no. 2, Feb. 2009, pp. 221–27. *PubMed Central*, doi:10.2105/AJPH.2007.131714.

West Virginia Department of Health and Human Resources. ***Opioid Response Plan for the State of West Virginia*.** Jan. 2018.

West Virginia State, Legislature. **Uniform Controlled Substances Act**. **W. Va.** Code, section 60A-9-9, 2017.

West Virginia State, Legislature, Senate. **Senate Bill 272.** 2018 Legislature, passed 7 Mar. 2018.

West Virginia State, Legislature, Senate. **Senate Bill 273**. 2018 Legislature, introduced 15 Jan. 2018.

West Virginia State, Legislature, Senate. **Senate Bill 335**. 2015 Legislature, passed 26 Feb. 2015.

Biography

Alexandra K. Bouthillette was born in Houston, Texas on June 17, 1997. She studied Finance, Business Honors, and Plan II Honors at The University of Texas at Austin in 2015. At university, she was involved in Texas Consulting Team, competed in several business case competitions, served in student leader roles for the Business and Plan II Honors Programs, and was a member of the Alpha Phi Sorority. She graduated with invitations to Phi Beta Kappa and Phi Kappa Phi in May 2019. Starting June 2019, she will work as an investment banking analyst in Houston, Texas.